Suid-Afrikaanse Tydskrif vir Geneeskunde
South African Medical Journal

Posbus 643, Kaapstad P.O. Box 643, Cape Town

Kaapstad, 18 Oktober 1958 Weekliks 2s. 6d. | Deel 32 No. 42 Vol. 32 | Cape Town, 18 October 1958 Weekly 2s. 6d.

SOME CLINICAL IMPRESSIONS OF HALOTHANE

JOHN TAIT RUSSELL, M.B., B.CH. (RAND), D.A. (ENG.), D.A. (IRE.), *Senior Honorary Anaesthetist, Livingstone Hospital, Port Elizabeth*

Halothane (Fluothane), 2—bromo—2—chloro—1, 1, 1—trifluoro-ethane (CF_3-CHC1Br) is about 2 years old, but has already proved itself to be an important addition to the anaesthetist's repertory. It is a new member of the halogen group of anaesthetics introduced by Imperial Chemicals Industries after exhaustive experiments on animals.

Physical Properties

Halothane is a liquid (producing a non-inflammable and non-explosive vapour) with a boiling point of 50·2°C, a specific gravity of 1·86 at 20°C, and a vapour pressure of 439 mm. Hg at 20°C. Its vapour is non-irritant and has a pleasant odour. Decomposition may occur when it is exposed to light, but this is prevented by the addition of 0·01% thymol and packing in dark-coloured bottles.

Pharmacology

Raventos[1] found the therapeutic ratio in animals to be 3·5, twice that of ether and chloroform. Surgical anaesthesia was produced with concentrations of 2-4%, induction taking up to 5 minutes without the usual 'stage of excitement'. Anaesthesia could be maintained with concentrations of 0·8-1·0%, a potency twice that of chloroform and 4 times that of ether. Hypotension, and respiratory arrest which is easily reversible by artificial respiration after stopping the halothane, were produced if the induction concentrations were maintained. Cardiac sensitivity to intravenous adrenaline was increased and bleeding was decreased. Recovery was rapid, even after long anaesthetics. Cardiac output was unchanged and electrocardiograms normal. A report by the Medical Research Council[2] showed, however, that cardiac output was reduced.

The mechanism of the hypotensive action of halothane is complex, possibly consisting of a central depressant effect, weakening of the myocardium and, to some degree, a peripheral ganglion block. As regards this latter action on the autonomic ganglia it is pointed out that the important practical aspect of this action is the potentiation of ganglion-blocking drugs such as d-tubocurarine or hexamethonium.

Johnstone[3] reports alarming drops in blood pressure and circulatory collapse after intravenous injections of 15 mg. of d-tubocurarine during halothane anaesthesia, and the accentuation of this collapse by positive- pressure inflation of the lungs.

The accentuation of parasympathetic action is a most important action of halothane, which results in a bradycardia and requires atropine to reverse the action. Riker and Wescoe (1951) showed that gallamine triethiodide (Flaxedil) has a specific action in paralysing the ability of the vagus to slow the heart, which should prove to give gallamine a special place in halothane anaesthesia. This was confirmed in this series of cases.

Types of Operation

Many different types of surgical procedures were undertaken in 300 cases. The youngest patient was 6 months-old and the oldest 87 years. The following is an analysis of the types of operation undertaken:

(1) *Gynaecological:* Abdominal 16 and vaginal 34; total 50.

(2) *Obstetrical:* Caesarian section 3.

(3) *Abdominal:* Upper 8 and lower 12; total 20.

(4) *Thoracic:* Lobectomy 20, pneumonectomy 5, thoracoplasty 7, hiatus hernia 5, thoracotomy 8, decortication 7, oesophagectomy 3, total gastrectomy 2 and bronchoscopy 2; total 59.

(5) *Ear, nose and throat:* Tonsillectomy 26, nasal 14 and laryngo-fissure 1; total 41.

(6) *Other:* Plastic 8, orthopaedic 24, thyroidectomy 26, head and neck 10, craniotomy 2, urological 6, angiogram 2, eyes 8, breast 23, varicose veins 4 and haemorrhoids and anal 17; total 130.

Total number of cases: 303.

There were 4 deaths in this series, none as a direct result of the anaesthetic. Three of the thoracic cases died later from other causes (2, carcinoma of oesophagus with secondary spread, and 1 gastric carcinoma with secondary spread who died of congestive cardiac failure and pulmonary oedema 10 days after the operation). The fourth death was caused by a malignant tumour of the temporal region with haemorrhage into the tumour. This patient died 12 hours after the operation having been unconscious before being taken to the operating theatre. The degree of unconsciousness,

however, was such that the patient still reacted violently to stimuli.

Premedication was relatively light: Promethazine 25-50 mg. 2 hours before operation, usually orally, and sometimes omitted; and pethidine 50-100 mg. and atropine 1/100 gr., 1 hour before the operation. Children, depending on age, were given pacatal, 1½ mg. per 1 lb. of body weight 2 hours before the operation and atropine ½ hour before the operation. On occasion pethidine or promethazine were used instead of pacatal. Atropine was always given to counteract the stimulation of the vagal action on the heart. Frequently a further 1/100 gr. atropine was given intravenously, if the operation was to be a long one. Morphine and its derivatives were not used because of their respiratory depressant effects.

TECHNIQUE AND RESULTS

The 'Fluotec' percentage fluothane vaporizer was used either with the standard Boyle's machine or the Oxford inflating bellows. Where possible a 4-litre gas flow per minute (50% nitrous oxide with oxygen), employing a Waters absorber unit, was used with the percentage vaporizer for the sake of economy, as advocated by Brennan *et al.*[4] In this series the circle absorber was not used on account of the possible dangerous high percentage concentration that, as Hudon, Chang and others have shown, might result.[5-8]

The 'fluotec' vaporizer has been shown to be accurate to within 0·05% at rates of gas flow between 4 and 10 litres per minute at all normal operating-theatre temperatures.[9] Possessing a thermostat the vaporizer was found to work exceedingly well.

The use of the 'fluotec' vaporizer with the Oxford bellows was found to be a most satisfactory technique, but it increased the amount of halothane required.

Induction was usually a sleep-dose of thiopenthone, as most patients find an injection preferable to 'the mask'. With nitrous oxide, oxygen and halothane, or halothane and air (using the Oxford bellows), induction was rapid, particularly in children, and the switch-over to ether gratifyingly easy when required, as pointed out by Bull *et al.*[10] There was no stage of excitement in any of these cases. Initially a 2% concentration was adequate for a reasonably rapid and pleasant induction with no coughing or breath-holding; a great asset for patients with difficult veins.

Relaxation was fair, but not comparable to that achieved with the relaxant drugs. Succinylcholine chloride was generally used for endotracheal intubation as a time-saving measure, for 15 minutes was usually required to facilitate intubation with halothane. Adequate relaxation for upper abdominal operations was not obtained with halothane alone as the hypotension was the limiting factor. Relaxant drugs had to be added for this type of operation. Of these the most satisfactory is gallamine triethiodide (Flaxedil), only half or less of the usual doses being required. Because of its atropine-like action gallamine decreased the tendency to a bradycardia and, as a rule produced, if anything, a slight tachycardia. As our experience with halothane increased, the tendency was to use a lower percentage of halothane with slightly larger doses of gallamine, which resulted in rapid recovery from a smooth and flexible anaesthetic—most satisfactory to both surgeon and anaesthetist. Only once was neostigmine considered necessary, and this drug, given intravenously after a dose of 1/50 gr. atropine, produced no muscarine-like action in a dose of 2·5 mg.

d-Tubocurarine was not used, for a number of workers have confirmed Johnstone's finding[3] of alarming drops in blood-pressure after 15 mg. doses followed by positive-pressure ventilation. There is a real risk of circulatory collapse. In fact, positive-pressure ventilation increases the hypotensive effects of halothane and smaller percentages should be used.[11]

Respiration was quiet initially, but increased in rate and decreased in depth as anaesthesia deepened, resulting in inadequate ventilation. If spontaneous respiration was wanted at this stage, the halothane concentration had to be decreased. Otherwise respiration had to be assisted.

This tachypnoea is a distinct disadvantage and small doses of pethidine were not found to relieve this to the extent that occurs with the trichlorethylene tachypnoea. Surgical stimulation occasionally produced a deeper respiration temporarily or produced a peculiar respiratory pattern consisting of a deep inspiration and expiration followed by a long pause.

Occasionally, if an endotracheal tube had not been passed, a crowing type of respiration resulted from surgical stimuli. But this seldom lasted, particularly if the depth of anaesthesia was increased.

Control of respiration was easily obtained without the addition of relaxant drugs. The assistance of the respiration was necessary, to some extent, in the majority of cases.

The pulse slowed an anaesthesia deepened, rates of 40 per minute being not unusual if the intravenous atropine had been omitted. Atropine usually remedied this.

The blood pressure fell 20-30 mm. of Hg within a short time. If, however, when this occurred, the halothane percentage was reduced, the blood pressure usually rose or, at least, did not continue to fall. Constant vigilance is necessary throughout and the pulse and blood pressure should be recorded at least every 4-5 minutes and even more frequently until anaesthesia has been stabilized.

The pulse rate did not always decrease in proportion to the drop in blood pressure, and not infrequently hypotension was present with some degree of tachycardia.

Blood replacement must be meticulous because the resulting vasodilatation prevents the normal vasoconstrictive response to blood loss and the blood pressure sometimes falls rapidly. This phenomenon occurs to a greater or lesser extent with most anaesthetics in present-day use, accurate blood replacement being an essential part of modern theatre technique.

In patients exhibiting signs of shock following haemorrhage or accidents, halothane was useful because a high oxygen percentage could be used; induction was quick and the blood-pressure fall minimal with adequate care. Induction was usually achieved with a 1·5% concentration and for maintenance of anaesthesia as little as 0·5% was sufficient for most patients. A warm, pink patient was the usual finding. In fact, the patient resisted surgical assaults with an unusual equanimity.

Recovery was rapid. Recovery-time is not in direct proportion to the length of the operation, but it increased with the duration of the anaesthetic. If, however, the percentage concentration was reduced towards the end of the operation, this greatly facilitated a more rapid recovery; the administration of halothane could be stopped 10-15 minutes earlier and in most cases .recovery of reflexes ensured

in the theatre. In this series the recovery times have improved with increasing experience, the average time now being 10-15 minutes. A striking feature is the rapid return of mental alertness, a valuable asset for out-patients. Violent shivering was not uncommon. This, however, appeared to have no deleterious effect, probably because it arises as a compensatory reaction to the loss of heat during operation.

Complications and Advantages

Extubation was sometimes attended by some degree of laryngospasm, which was never troublesome and could be quickly controlled by the insertion of a pharyngeal airway and the administration of oxygen.

Analgesia was poor. Many patients, particularly those who had thoracotomies performed, required intravenous administration of analgesics before leaving the theatre. This was not felt to be a disadvantage because timely administration of analgesics prevented restlessness.

Salivary and Bronchial Secretions were diminished and pharyngeal suction was usually not necessary at the conclusion of the operation.

Post-operative Vomiting was minimal. Only 2 patients in this series vomited for 1 day. In both cases the vomiting ceased when the post-operative analgesic was changed. Most patients felt no nausea and, if analgesics were administered in time, were comfortable.

With adrenaline ventricular tachycardia and extrasystoles were produced in 2 patients—in 1 after a submucous resection of the septum and in the other after a bilateral intranasal antrostomy. In both cases cocaine with adrenaline was injected submucosally. Immediate reduction of the halothane concentration resulted in a return to normal rhythm within a few minutes. But the experience was alarming because the possibility of ventricular fibrillation has to be considered.

Johnstone[3] reported ventricular extrasystoles in 12 cases; in each case there was some degree of underventilation.

Ventricular tachycardia was reported by Millar[12] after subcutaneous injection of adrenaline. Burns[13] found that ventricular extrasystoles were not of the multifocal variety usually considered the precursor of ventricular fibrillation. This statement, in the light of our present knowledge of halothane, should be accepted with caution. If the marked depression of respiration with its associated risk of sub-oxygenation and carbon-dioxide retention is taken into account, the possibility of the precipitation of ventricular fibrillation cannot be discounted.

In thoracic surgery the minimal bleeding from the necessarily large incision, the ease with which the respiration can be controlled (especially with the addition of small doses of gallamine) the smoothness and flexibility of the anaesthesia, the rapid return of consciousness and the satisfactory immediate post-operative breathing associated with this anaesthetic are of great assistance in this type of work.

The gravid uterus is considerably relaxed by halothane. For this reason its use in obstetrics is contra-indicated. Mackay[14] appears to be the first worker to record this and several others[15-17] have since observed this property. In 3 Caesarian sections in which I administered the anaesthetic (nitrous oxide, oxygen and halothane), blood loss *per vaginam* was considerable and the uterus failed to contract in spite of 2 intravenous injections of 0·5 mg. of ergometrine. Not until the halothane was stopped and a few minutes had elapsed to allow some recovery from its effects, did the uterus contract.

Porphyria. There was no opportunity to use halothane in the cases of porphyria which are prevalent in this area.

DISCUSSION

There seems no doubt that there is a place for halothane in modern anaesthetic practice. Its merits and demerits are as follows:

Advantages

(*a*) Ease of administration due to its potency and flexibility.

(*b*) Pleasant and rapid induction and recovery for the patient.

(*c*) Reduction of bleeding without the fussiness and possible dangers of other hypotensive techniques.

(*d*) Use in shocked patients possible because of high oxygen percentage and, with proper care, minimal disturbance of blood pressure.

(*e*) Prevention of the shock syndrome if blood replacement is adequate.

(*f*) Relative safety if used with care by an experienced administrator. An accurate percentage vaporizer is necessary.

(*g*) Non-explosive and non-inflammable.

Disadvantages

(*a*) Production of bradycardia and hypotension, requiring constant vigilance.

(*b*) Marked depression of respiration leading to hypoxia and carbon dioxide retention unless anaesthesia is maintained in a 'light' plane or respiration is assisted.

(*c*) Sensitization of the cardiac muscle to the action of adrenaline with the possibility of ventricular fibrillation.

(*d*) Relaxing effect on the uterine muscle of the pregnant uterus, which virtually excludes its use in obstetrical anaesthesia.

These properties bear a resemblance to those of chloroform and, to some extent, of trichlorethylene (also halogen compounds) but, up to the present, from all acounts, halothane appears safer particularly when compared with the former.

(*e*) *Expense.* The present price is over £13-0-0 per bottle of 250 cc.—sufficient for 15-20 cases.

SUMMARY

The clinical effects of halothane, as observed in 300 administrations, are discussed. The need for an accurate vaporizer, and the necessity for care in administration are stressed. Advantages and disadvantages are summarized.

I should like to thank Imperial Chemical Industries for the supply of fluothane with which I carried out this work. Also I should like to express my appreciation for the help and invaluable advice given me by my partner Dr. R. A. Moore Dyke.

REFERENCES

1. Raventòs, J. (1956): Brit. J. Pharmacol., **11**, 394.
2. Medical Research Council (1957): Brit. Med. J., **2**, 479.
3. Johnstone, M. (1956): Brit. J. Anaesth., **28**, 392.
4. Brennan, H. J., Hunter, A. R. and Johnstone, M. (1957): Lancet, **2**, 453.
5. Hudon, F. *et al.* (1957): Canad. Anaesth. Soc. J., **4**, 221.
6. Chang, J. *et al.* (1957): *Ibid.*, **4**, 187.
7. Stephen, C. R. *et al.* (1957): *Ibid.*, **4**, 246.
8. Foster, C. A. (1957): Lancet, **1**, 1144.
9. Brennan, H. J. (1957): Brit. J. Anaesth., **29**, 332.
10. Bull, A. B., du Plessis, C. G. G. and Pretorius, J. A. (1958): S. Afr. Med. J., **32**, 130.
11. Kay, H. T. (1958): Anaesthesia, **13**, 192.
12. Millar, R. A. *et al.* (1958): *Ibid.*, **13**, 164.
13. Burns, T. H. S. (1957): Brit. Med. J., **2**, 483.
14. Mackay, I. M. (1957): Canad. Anaesth. Soc. J., **4**, 235.
15. Kay, H. T. (1958): Anaesthesia, **13**, 192.
16. Russell, J. T. (1958): *Ibid.*, **13**, 242.
17. Albert, S. N. (1958): Personal communication.

Suid-Afrikaanse Tydskrif vir Geneeskunde : South African Medical Journal

VAN DIE REDAKSIE : EDITORIAL

DIE ONDERRIG VAN KLINIESE ELEKTROKARDIOGRAFIE

Die huidige ondersoekmetode van kliniese elektrokardiografie het 'n fase bereik waarin dit goed gestandaardiseerd is, en waar die interpretasie van grafieke binne die bereik van elke geneesheer geplaas kan word. Nogtans word die dosering van hierdie onderwerp in die onderwysinrigtings van ons land, asook in die meeste ander lande, aan voorgraadse studente òf gladnie onderneem nie, òf slegs op baie oppervlakkige wyse afgehandel. Gevolglik ontbreek die kennis aangaande elektrokardiografie ook by baie praktiserende geneeshere.

Ten spyte van die monopolie op die gebied van die interpretasie van elektrokardiogramme wat deur hierdie onderwysstelsel op die spesialis feitlik afgedwing word, gebeur dit dat daar talle praktisyns, veral op die platteland, vir hulle elektrokardiografiese toestelle aanskaf. Die apparaat word in die gebruik gestel en die grafieke word gelees en geïnterpreteer op die grondslag van selfaangeleerde kennis wat dikwels gehaal word uit die talle klein en ondoeltreffende brosjures wat uitgegee word. Die verskyning van hierdie soort literatuur is juis 'n teken van die behoefte van die algemene praktisyn om so spoedig moontlik 'n praktiese kennis op te doen van elektrokardiografie.

Dien ten gevolge word daar 'n diens gelewer wat vir die pasiënt besliste nadele mag inhou. As gevolg van verkeerde opvattings en verkeerde elektrokardiografiese diagnose (wat wel ook by opgeleide elektrokardioloë voorkom, hoewel in 'n mindere mate) kan pasiënte wat geen hartaandoening het nie, weke tot maande lank bedlêend gemaak word—en 'n permanente kardiale neurose opdoen. Die werklike diagnose kan, andersom, misgekyk word, en 'n niksvermoedende pasiënt wat ernstig siek is kan in lewensgevaar beland omrede van negatiewe optrede in verband met sy toestand.

Die publiek is elektrokardiogram bewus. Die praktisyn word om hierdie rede gedwing om die ondersoekmetode aan te leer. As hy dit nie doen nie raak hy in die onguns by sy pasiënt. Die tyd het aangebreek dat hierdie onderwerp ernstig en doeltreffend doseer moet word aan alle voorgraadse studente. Dit sou net so ongeregverdig wees om ons geneeskundige studente te onthou van 'n kennis oor die bloedbeeld. Dit is te verwagte dat elkeen 'n gewone bloedbeeld en differensiële seltelling kan interpreteer, en niemand sal betwis hoe groot die waarde hiervan is vir 'n beslissing oor die diagnose van 'n toestand en vir die korrekte hantering van 'n pasiënt nie. Die elektrokardiogram, as 'n enkele ondersoekmetode, verskaf meer inligting as 'n bloedtelling, op vergegelykende grondslag, by dié pasiënt waar een of die ander ondersoek aangedui word.

Hierdie ondersoek kan van die grootste betekenis wees by die diagnose en behandeling van geleidingstoornisse in die hart. Die belangrike differensiële diagnose van pyn in die borskas kan dikwels nie hiersonder finaal beslis word nie. Kardiale infarksie word as gevolg van hierdie ondersoek bevestig en die pasiënt daarvolgens behandel en sy lewenswyse daarvolgens verander. Afgesien van die diagnostiese waarde van elektrokardiografie by verworwe en kongenitale harttoestande van velerlei geaardheid, is hierdie ondersoek dikwels noodsaaklik vir 'n beslissing in verband met die chirurgiese moontlikhede by besondere letsels. Die elektrokardiogram verleen hulp by die diagnose van aktiewe rumatiekkoors, by perikarditis en miokarditis, en dit gee 'n aanduiding van die teenwoordigheid van longpatologie soos bv. emfiseem. Ook elektroliet-stoornisse, veral dié in verband met kalium en kalsium, kan in die elektrokardiogram weerspieël word en as sodanig is hierdie ondersoekmetode van belang by verskeie toestande soos niersiektes, gastro-intestinale siektes en endokrinologie.

Daar moet egter sonder verwyl bygevoeg word dat dit ewe noodsaaklik is om die student, en gevolglik die praktisyn, in te lig in verband met die tekortkominge van hierdie ondersoek. Die elektrokardiogram, net soos ander spesiale tegnieke, kan nooit dien as 'n plaasvervanger vir 'n kliniese geskiedenis en 'n fisiese ondersoek nie. Sonder hierdie meegaande inligting behoort daar geen vaste elektrokardiografiese diagnose gemaak te word nie. Elektrokardiografie is 'n hulpmetode en moet nie gebruik word as 'n kortpad tot 'n diagnose nie, want in dié geval sal daar meer foute begaan word as wat sou plaasgevind het sonder die gebruik van dié metode. Almal besef bv. nie dat 'n miokardiale infarkt meer akkuraat gediagnoseer kan word op grond van die geskiedenis en fisiese bevindings (met die toevoeging van eenvoudige laboratoriumproewe, soos 'n bloed-besinkingsnelheid en 'n witsel-telling) as wat dit met die kardiogram gemaak kan word nie.

THE PRODUCTION OF ANTIBIOTICS

The greatest number of effective antibiotic agents are produced by the actinomycetes; the genus *Streptomyces* has provided most of the chemotherapeutic compounds. Since 1940 more than 300 antibiotics have been obtained from cultures of actinomycetes, many in crystalline form and chemically identifiable. A number of these antibiotics are used in the treatment of infections in man and animals, especially against bacteria, but also, to some extent, against fungi, rickettsiae and viruses.

Among the antibiotics produced by actinomycetes there are many which contain therapeutic agents, but there are also many others which have not proved satisfactory for this purpose. Among the antibiotics which are active against bacteria alone are streptomycin, neomycin and novobiocin; active against fungi alone, nystatin. There are also antibiotics active against bacteria and fungi, e.g. streptothricin. Some antibiotics are active against bacteria, rickettsiae and certain larger viruses, e.g. chloramphenicol and tetracyclines; and

others against bacteria, fungi and malignant cells, e.g. actinomycin; but unfortunately none of the antibiotics can as yet be regarded as effective antineoplastic agents for safe use in man although the field is still open and not without promise. So far none of the preparations with alleged value against the smaller viruses have found practical application.

Different strains of the same actinomycete organism show great differences in the qualitative and quantitative production of antibiotics. The culture medium is important in determining this production. An organism may be able to produce only one antibiotic, but under specially arranged conditions it may produce two or more antimicrobial agents differing only slightly in chemical structure, e.g. the streptomycins, neomycins and tetracyclines. The same antibiotic can be produced by different organisms, and different strains of the same organism can produce different antibiotics. Thus there are many interesting aspects in the production of antibiotics by actinomycetes and other micro-organisms.

Many problems face the investigator in search of new antibiotics: e.g., the problem of developing suitable media for the culture and for the production of its antibiotic products, and the problem of developing strains that will give higher yields than the original culture. Procedures have to be devised for the isolation, purification and identification of the active chemical constituents of antibiotics for, while some of the available antibiotics are well-known definite chemical entities, others are mixtures of closely related or different forms. Pharmacological, toxicological, bacteriological and clinical tests must then be performed to evaluate the new antibiotic. This calls for team work, culminating in an association with engineering chemists to develop suitable methods for large-scale production of the antibiotic.

In an excellent monograph recently published, the programme of work that led to the discovery, isolation and evaluation of neomycin is described, which will serve as a useful reference volume not only for this widely used agent, but as a model for the investigation of other antibiotics.[1]

1. Waksman, S. A. *et al.* (1958): *Neomycin.* London: Ballière, Tindall and Cox.

HEIGHTS AND WEIGHTS OF EUROPEAN AND COLOURED† SCHOOLCHILDREN IN CAPE TOWN*

G. M. LURIE, M.B. (CAPE TOWN), M.R.C.P. (EDIN.), D.C.H. and F. J. FORD, M.D., F.R.F.P.S. (GLAS.)

Department of Child Health, University of Cape Town

The most generally accepted standards for comparison of one child or group of children with another are those of height and weight. Birth weights are regarded as important in the assessment of neonates and the progress of infants is largely estimated by the mothers and their professional advisers on the basis of a satisfactory weight gain. Height, being much more difficult to measure with reasonable accuracy in early life, is given rather less attention until a few years have passed, when the child becomes more interested than anyone else in his or her elevation from ground level. Since, then, these simple physical measurements are of widespread interest and importance it is surprising to discover that little attempt has been made to establish the normal pattern of height and weight in a community which has been for several centuries the Mother City of Southern Africa.

In the past 25 years various local and racial studies have been made. Some of these have dealt with infants, others with older children, but the majority of the figures have been collected from boys and girls under school age. Sometimes there has been no attempt to differentiate between the sexes or between the ethnic groups involved. Other reports have been primarily concerned with the social-medicine aspect or have been based on a particular section of a community. Consequently, a number of current beliefs are unsupported by any satisfactory evidence and it seems at least possible that local partisan impressions may be erroneous. For purposes of comparison with the height and weight standards of other areas and other countries it is obvious that a tolerably accurate set of figures for the local children should be acquired. At present the standard of comparison is taken from the tables in British and American text-books on the assumption that these are normal also for Cape Town children, though some people add 3–4 lb. to these standards to arrive at the hypothetical local norm. These comments apply particularly to children of school age and the present report has been compiled to determine the facts of the situation.

The present investigation was designed to establish normal standards of height and weight for both European and Coloured children between 6 and 15 years of age attending schools under the control of the Cape Town Education Authority. The original intention was to obtain figures also for African children, but unexpected difficulties prevented this and their omission is probably not too great a misfortune, since the results would not have been representative of the local African child population.

The numbers involved were considerable—a total of approximately 84,000 European and Coloured. The information on which this paper is based was obtained from the schools' medical cards which were made available by the helpful cooperation of the Superintendent General of Education, the Chief Medical Inspector of Schools, and the Heads of the schools selected by our sampling technique. All the Government schools, irrespective of class or creed, in the Cape Town Municipal Area were included in two lists, European and Coloured, and these were drawn up by the office staff of the Chief Medical Inspector for reasons entirely unconnected with this enquiry. Our statistical adviser laid down the procedure for selection of the particular schools to be visited and for the choice of children in those schools (see Appendix). The relevant details were taken from the medical cards found by this procedure. The children themselves were not seen. The question of any personal influence in the choice

* Presented at a Seminar at the Red Cross War Memorial Children's Hospital, Rondeboschp, Cae.

† Coloured children are of mixed European and African descent.

was totally eliminated and any difficulties which might have arisen from having to seek parental authority for physical examination were avoided.

This random sample provided information concerning 534 European boys and girls in 14 schools, and 449 Coloured boys and girls in 12 schools (Table I) and from that material the tables and charts were made. Boys and girls were dealt with separately in each ethnic group, and each year of age from 6 to 15 years inclusive was scrutinized. It was then possible to construct tables and charts showing the status of Cape Town children, the relationship of the sexes and races, and their international placing.

TABLE I. NUMBER OF CHILDREN STUDIED IN EACH AGE-GROUP

Age (yrs.)	European		Coloured	
	Girls	Boys	Girls	Boys
6– 7	15	31	30	19
7– 8	20	33	24	27
8– 9	21	31	23	27
9–10	17	20	24	24
10–11	42	25	24	26
11–12	46	19	20	28
12–13	44	22	23	22
13–14	31	19	23	23
14–15	43	55	32	30
Total	279	255	223	226

In the text of this report when a general statement is made it is based on the median figure for the observations. This, of course, refers to the middle observation of that group and is not necessarily the same as the average for the group. Similarly, the 10th percentile line excludes the lowest tenth of the observations for that group and the 90th excludes the highest tenth.

HEIGHT

European Children (Table II)

The figures in Table II were taken from the graphs where the 10th and 90th percentile and the median lines crossed the year-of-age line. The figures for the actual observations plotted on the 8 graphs (Figs. 5-12) in the Appendix are given in Tables XIII-XVI (Appendix), together with the corresponding figures for the smoothed curve, to show that such discrepancies as there are make no material difference to the general picture. It appears that the growth pattern of the two sexes is different. Between 6 and 10 years the boys grow approximately 1¾ inches per year while the girls gain 2¼ to 2½ inches. From 11 years onwards the boys grow at least 2¼ inches annually while for the girls this is the maximum figure and it decreases thereafter so that between 14 and 15 years the girls' yearly increment is half that of the boys. At 14 years of age the heights of the two sexes are very similar. Before that age the girls tend to be the taller but by 15 years the boys have not only wiped out the deficit but have established a definite lead of an inch.

Coloured Children (Table III)

The identical pattern is shown here but the boys show an even greater sluggishness in growth so that by 14 years of age the girls are still ahead though in another year they have been outgrown.

When the heights of the two racial groups (Tables IX and X) are compared it is obvious that the children of direct European descent are considerably taller than the Coloured children. The deficit in the latter is generally between 2 and 3 inches and is smaller in the females than it is in the males. This will be discussed later.

TABLE II. HEIGHT OF CAPE TOWN EUROPEAN CHILDREN (INCHES)

Age	Boys				Girls			
	P10	Median	P90	Range	P10	Median	P90	Range
6	43½	46	48½	4½	42½	45	48½	6
7	45½	47½	50	4½	44½	47½	51	6½
8	47	49½	52	5	46½	50	53½	7
9	48½	51½	54½	5½	49	52½	56	7
10	50½	53½	56½	5½	51	54½	58½	7½
11	52½	55½	58½	6½	53½	56½	60½	7½
12	54½	57½	60½	6½	55½	59	62½	7½
13	56½	60	63½	6½	57	60½	65	8
14	58½	62½	66½	7½	58½	62½	66½	8½
15	61½	65½	69½	8	60	64	68½	8½

TABLE III. HEIGHT OF COLOURED CHILDREN (INCHES)

Age	Boys				Girls			
	P10	Median	P90	Range	P10	Median	P90	Range
6	40½	44½	46½	6	40	42½	45	5
7	42	45½	48	6	42½	45½	47½	5½
8	43½	47	49½	6½	44½	47½	50	5½
9	44½	48½	51½	6½	46½	49½	52½	6
10	46½	50½	53	6½	48½	52	54½	6½
11	48½	52	55½	7	50½	54	57	6½
12	50½	54½	57½	7	52½	56	59	6½
13	52½	56½	59½	7½	54½	58	61	6½
14	54½	59½	62½	7½	56½	60	62½	6½
15	57½	62½	66	8½	58	61½	64½	6½

TABLE IV. WEIGHT OF EUROPEAN CHILDREN (LB.)

Age	Boys				Girls			
	P10	Median	P90	Range	P10	Median	P90	Range
6	39½	46½	53	13½	38½	45	52½	14
7	43	51	58½	15½	42	49½	59	17
8	48	56½	65	17	46½	55	66	19½
9	53½	62	72	18½	51	61	74	23
10	57	68	79½	22½	56	67	82	26
11	62	74½	88	26	62	75	91	29
12	68	82	98	30	69½	83	101	31½
13	75	90	109	34	77½	93	113	35½
14	83½	102	123	39½	87	104	127	40
15	94	117	138	44	98	117	141	43

TABLE V. WEIGHT OF COLOURED CHILDREN (LB.)

Age	Boys				Girls			
	P10	Median	P90	Range	P10	Median	P90	Range
6	34	42	49	15	33	41	50	17
7	36	44	51½	15½	36	43½	54	18
8	38	47	55	17	39½	48	58	18½
9	41	50	59	18	43½	53½	64	20½
10	44	54	64	20	48½	59½	70½	22
11	48½	59½	71	22½	53½	66	78	24½
12	54	66	79	25	59½	74	87	27½
13	60½	74	88	27½	67	83	98	31
14	69	84	100	31	75	94	112	37
15	79	96	114	35	85	106	130	45

WEIGHT

European Children (Table IV)

At 6 years the boys are 1½ lb. heavier than the girls and they continue to weigh slightly more than the girls until the age of 11 years, when the girls increase in weight at a slightly faster rate for a few years. The boys then gain weight a little more rapidly so that at 15 years the median weight for both sexes is 117 lb.

Coloured Children (Table V)

At 6 and 7 years the boys are heavier than the girls, but from 8 years onwards there is an increasing disparity between them, the girls steadily increasing their advantage until at 15 years they are 10 lb. heavier. That this is not due to any general difference in pattern of the weight increase is shown in the charts. It is a matter of degree and will be referred to again.

At no stage do the Coloured match their European counterparts so far as weight is concerned (Tables XI, XII). The boys at 6 years of age weigh 4½ lb. less than the Europeans and, as their annual weight gain is less, there is a difference of 21 lb. weight at the age of 15. The Coloured girls at 6 weigh 4 lb. less than the European girls and at the age of 15 years

they are 11 lb. lighter. The general trend in both sexes and both races is similar.

DISCUSSION

The literature on physical measurements in South Africa is not large. Such as it is, it must be examined to discover what other investigators have found. The Bantu has been extensively studied by Kark,[1] Le Riche[2] and Botha *et al.*[3] but little is known of the Coloured and European school children.

The nursery-school period has been studied by Philips[4] and Woodrow and Robertson[5] for the European group, and by Woodrow and Robertson[5] in Coloured children but little is known of physical development once they reach school-going age. Le Riche[6] investigated the status of European school children in Pretoria and in the Cape the only available data refer exclusively to Europeans. In 1935 Maughan Brown[7] weighed and measured 18,000 European school children in various parts of the Cape Province but, presumably, these figures are now out of date. In any case there is no means of knowing what districts of the Province were involved nor which figures refer to urban and which to rural populations. Freed[8] assessed 300 children (236 European and 64 Coloured) from the Velddrift area of the Cape Province but for purposes of comparison these figures have to be discarded since they refer to a closed community and do not differentiate between Europeans and Coloureds.

When Woodrow and Robertson did their work on European and Coloured nursery-school children, they found a negligible variation in height and weight between boys and girls and for that reason they did not quote separate figures for the two sexes. Philips studied only European nursery-school children and divided them into upper and lower income groups but, unfortunately, did not give any measurements for the higher income category at 6 years of age.

Comparison of the figures for the three recent estimates (Table VI) of height and weight in Cape European children at 6 years of age shows a scatter of 0·9—1·6 inches in the height assessments, and of 2—2·4 lb. in the weights. These

TABLE VI. COMPARATIVE FIGURES (CAPE TOWN)

		European Boys		*European Girls*		*Coloured Boys*		*Coloured Girls*	
	Age (years)	*Height (inches)*	*Weight (lb.)*	*Height (inches)*	*Weight (lb.)*	*Height (inches)*	*Weight (lb.)*	*Height (inches)*	*Weight (lb.)*
Philips lower income	6	44·34	47·71	44·42	43·33				
Woodrow and Robertson	6	45·3	45·6	45·3	45·6	43·2	37·5	43·2	37·5
Present series	6	46	46½	45	45	44½	42	42¾	41

figures are less than the annual height and weight gains at this age and are possibly attributable to variations in the estimation of age in the three series. The present figures refer to the median status at the child's birthday anniversary. The three series are sufficiently in accord to dispel any doubt about the representative validity of our report. There are no comparable figures for other age-groups. It is also apparent that, apart from differences of 3½ and 4½ lb. in the respective weights of Coloured girls and boys, the figures for 6-year-olds in the present series show no inexplicable discrepancy when compared with those of Woodrow and Robertson. The Coloured children of the two series compare fairly closely in height, and the weight gain may well be a reflection of improved social conditions in the interval between the two assessments.

Growth in height and weight is dependent on so many factors, heredity, social status, endocrine influence, muscular activity, etc.—that a considerable variation at any particular age is to be expected. This has been emphasized frequently in recent years and it is now generally accepted that any measurement falling between the 10th and 90th percentiles of those for that age is within the normal range. The modern custom of depicting the normal range by a three-line graph instead of the old method of drawing one average line is soundly based on this scatter. There is nothing unusual about the extent of the scatter in the charts of the present series. There is, however, subject for comment on the variations in progress of the two sexes and the two ethnic groups studied.

Figs. 1 and 2 and Table VII show that in the boys of both groups the impetus of growth increases gradually with the passage of time. Between 6 and 7 years the annual increase in height is between 1¼—1¾ inches whilst at 14—15 years it has increased to almost 3 inches. The rate seems to rise most quickly after the age of 12 years. In girls the trend is in the opposite direction. They appear to grow more quickly between 6 and 8 years than at any other time in the school-going period, and they maintain an annual increment superior to that of the boys until about 13 years, when their yearly increase in height decreases very distinctly. The boys

TABLE VII. ANNUAL GAIN IN HEIGHT (inches)

Age (years)	7	8	9	10	11	12	13	14	15
American Boys	2⅜	2¼	2	2	1¾	2¼	2	3	2
American Girls	2¼	2½	1¾	2¼	2½	2¾	2	1	¾
British Boys	2	2¼	2	2¼	1½	2	2	1½	
British Girls	2¼	2	2½	2	2¼	2	2	1½	
Cape Town:									
European Boys	1¾	1¾	1¾	2	2¼	2¼	2¼	2¾	3
European Girls	2¼	2½	2¼	2¼	2½	2¼	1⅝	1½	1¼
Coloured Boys	1½	1½	1⅝	1⅝	1⅝	1¾	2¼	2½	3
Coloured Girls	2⅜	2¼	2¼	2¼	2	2	2	2	1¾

TABLE VIII. ANNUAL GAIN IN WEIGHT (lb.)

Age (years)	7	8	9	10	11	12	13	14	15
American Boys	6½	6	6	5	6½	7	9	14½	12½
American Girls	5½	6	6	6½	8½	8½	11½	9½	3
British Boys	4½	4½	5½	6½	4½	9	7	11	
British Girls	4½	6½	6½	6½	7	8½	11	11	
Cape Town:									
European Boys	4½	5½	5½	6	6½	7½	8	12	15
European Girls	4½	5½	6	6	8	8	10	11	13
Coloured Boys	2	3	3	4	5½	6½	8	10	12
Coloured Girls	2½	4½	5½	6	6½	8	9	11	12

show a spurt of growth about the commonly accepted age of puberty. The girls do exactly the opposite. These characteristics are shown by both ethnic groups but, while the two lots of girls proceed on very closely approximated tracks, the progress of the boys is much less alike. The Coloured boys lag behind their European counterparts until about 13 years of age; thereafter the two rates of growth are identical. There is no obvious reason for these sex and race differences but the net result is that at 15 years the median height of a Coloured boy is 3½ inches and of a girl 2½ inches less than that of their Cape Town European contemporaries.

It is generally assumed that growth in childhood is an ever-slowing process but these charts of the rate of increase in height are not in accord with this dictum. Johnston[9] has already charted a difference between the sexes. His graph shows a sex difference comparable to ours, though not quite identical, and his explanation is that growth in

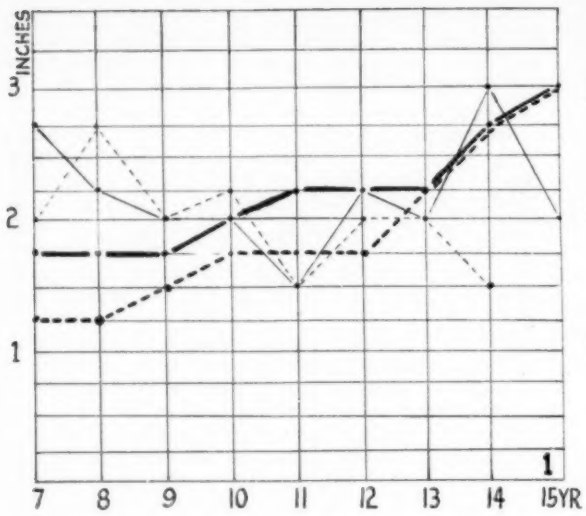

Fig. 1. Boys' annual increase in height (inches)*.

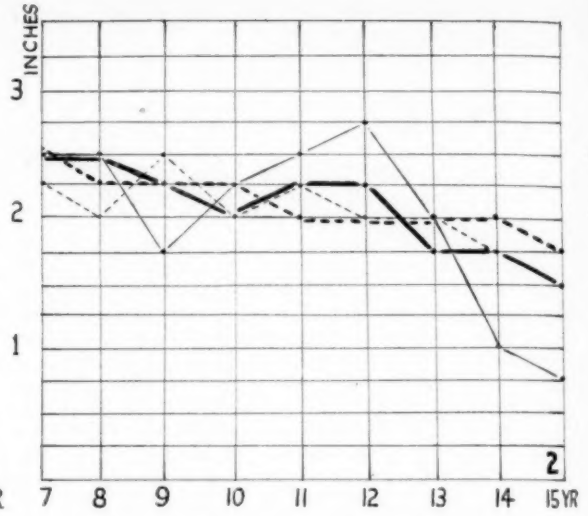

Fig. 2. Girls' annual increase in height (inches)*.

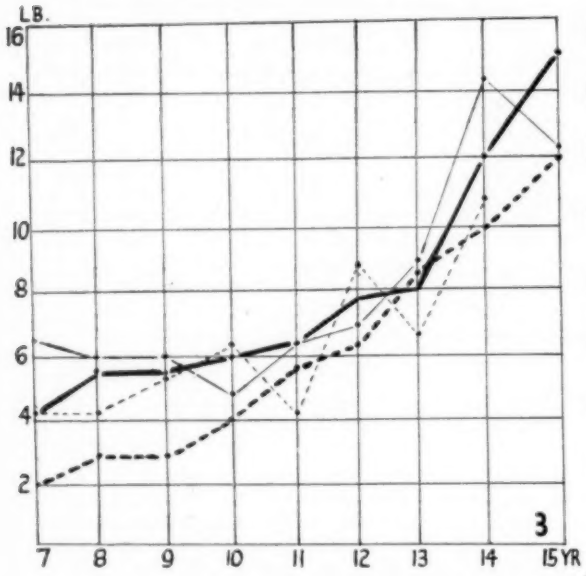

Fig. 3. Boys' annual increase in weight (lb.).*

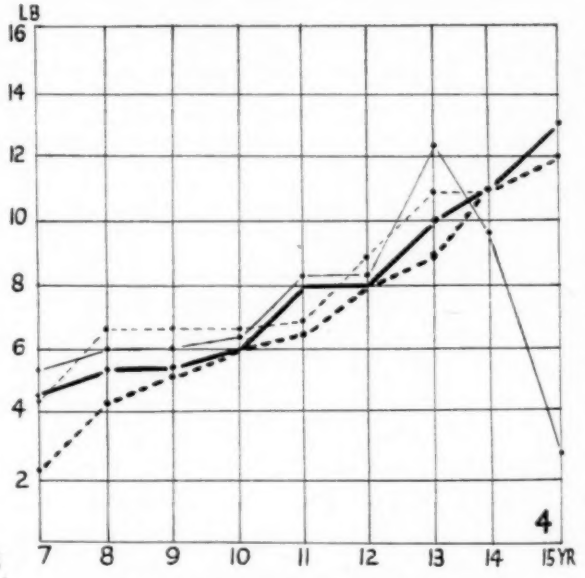

Fig. 4. Girls' annual increase in weight (lb.).*

length decreases rapidly in rate after puberty which, he avers, is 2 years earlier in the female than in the male.

Our graphs for the girls conform to the accepted pattern, though the American line is somewhat erratic. The similar contrast of Cape Town boys with those overseas is striking in the discrepancies shown. British and American boys follow the female pattern till about 11 years, when the Americans at least change to that of the Capetonian males, i.e. show a growth spurt. In both Cape Town and America the ethnic derivation is from comparable mixed European stock and it is unlikely that the differences are hereditary in origin. The fact that the girls all conform to one pattern supports this assumption and also makes it improbable that climate plays any direct part. Hormonal influence would likewise appear to be comparable in the four groups of each sex. The diet of the average female in the three groups of European descent is vastly different from that of the Cape Coloured girls, yet the rate of growth in height of all four is very similar. The diet of the average Cape European boy is certainly not materially inferior, if it is not indeed superior,

* American = continuous thin line, British = interrupted thin line. Cape Town European = continuous heavy line. Cape Town Coloured = interrupted heavy line.

to that of the British boy, yet the former appears to grow more slowly than his northern brother. Usually, and for reasons best known to their mothers, when food is in short supply the male of all ages is given priority over the female so that in the less well-endowed Coloured community it might be expected that the boys would have an advantage over the girls. The charts show no such trend. Between 6 and 12 years the Coloured girls grow faster than the boys. The reason cannot lie in the sampling methods since, presumably, the males and females of the three series were in each case alike for the two sexes. The most reasonable explanation may lie in the energy expenditure of the various groups. Girls, generally, pay lip service to muscular activity. Capetonian boys of both races are, on the other hand, probably far more active than either British or American boys from a much earlier age and the climatic conditions encourage this. They may use more of their energy in exercise and therefore grow more slowly in height than do the British and American groups and the females of the same age in the same town.

If this is true the effect should be still more obvious in the matter of weight. Table VIII and Figs. 3 and 4 would appear to confirm the theory. The annual weight increment of all Cape Town children increases steadily throughout the age period of this investigation. The girls of other lands do so too, except Americans of over 13 years, and the reason for their exception may not be unassociated with the dictates of fashion. The graphs for British and American boys' weights might reflect certain scholastic and social turning-points in their lives. The relatively poor place taken on every comparative graph by the Coloured children could reflect their mediocre feeding since, to a much more obvious extent, increase in weight is more intimately associated with the food supply than is increase in height. Further support is given by the greater disparity in weight between Coloured boys and all the other boys than is shown by the Coloured girls, though these show a similar, less marked, lag behind their sisters of European descent. But it is doubtful if this is the whole story since, even at 8 years of age, the Coloured girls have established a lead over the boys in both height and weight.

The median heights and weights of Cape Town European, Cape Town Coloured, British and American children are shown in Tables IX-XII and Figs. 13-16. The British and American figures have been converted from centimetres and kilograms to the nearest $\frac{1}{4}$ inch and $\frac{1}{2}$ lb. The source of the British figures is Illingworth[10] and the subjects were London County Council school children. The USA figures come *via* Stuart and Stevenson[11] from studies of the Iowa Child Welfare Research Station. The comparative status is shown in Figs. 13-16.

TABLE IX. COMPARATIVE: BOYS' HEIGHT (inches)

Age (years)	6	7	8	9	10	11	12	13	14	15
American	46½	49	51¼	53¼	55½	56¾	59	61	64	66
British	44½	46½	49¼	51¼	53½	55	57	59	60½	
Cape Town:										
European	46	47¾	49½	51½	53½	55½	57¾	60	62¾	65¾
Coloured	44½	45¼	47	48½	50¼	52	54¼	56½	59½	62¼

TABLE X. COMPARATIVE: GIRLS' HEIGHT (inches)

Age (years)	6	7	8	9	10	11	12	13	14	15
American	45½	48	50¾	52¾	54¾	57	59¾	61¾	62¾	63¾
British	44½	46¾	48¾	51¼	53¼	55½	57¾	59½	61¾	
Cape Town:										
European	45	47½	50	52½	54½	56¾	59	60¾	62½	64
Coloured	42¾	45¼	47½	49¾	52	54	56	58	60	61¾

TABLE XI. COMPARATIVE: BOYS' WEIGHT (lb.)

Age (years)	6	7	8	9	10	11	12	13	14	15
American	48½	54	60	66	71	77½	84½	93	107½	120
British	46	50½	55	61½	68	72½	81½	88	99	
Cape Town:										
European	46½	51	56½	62	68	74½	82	90	102	117
Coloured	42	44	47	50	54	59½	66	74	84	96

TABLE XII. COMPARATIVE: GIRLS' WEIGHT (lb.)

Age (years)	6	7	8	9	10	11	12	13	14	15
American	46½	52	58	64	70½	79	87½	99	108½	113½
British	44	48½	55	61½	68	75	83½	94½	105½	
Cape Town:										
European	45	49½	55	61	67	75	83	93	104	117
Coloured	41	43½	48	53½	59½	66	74	83	94	106

It can be seen from the median heights and weights that the American boys are heavier and taller than the other 3 groups. The Cape Town European boys are slightly shorter and lighter and they are closely followed by the British schoolboys. The Cape Coloured boys are very much shorter and lighter than the other groups.

So far as the girls are concerned, the American girls are again the tallest and heaviest except at approximately 15 years of age, when the Cape Town European girls overtake them. After them come the British and finally the Cape Coloured girls. The latter are, once again, far below the others, although the difference is less marked than in the males.

Similar comparisons have been made in the past. Cluver *et al.*[12] found that South African European children were taller and heavier than the Americans, especially the boys. Freed found the reverse of that picture but his subjects were not really suitable for any comparison tests. Maughan Brown noted favourable comparison between his widely scattered Cape Province European children and those of similar racial stock in England, Australia and America. In both sexes the heights of Cape European, English and American children were the same but the Cape boys were heavier than the others at all ages and the Cape girls at the older ages. Le Riche found that American children from the higher income category were taller and heavier than his Pretoria schoolchildren of European descent.

The international comparison graphs and figures presented here do not show any very notable differences among the children of European stock in the three continents. The most striking feature is the poor position of the Coloured children and the actual figures are more revealing than the graph. We have already shown that the growth pattern in the two sexes, in the Cape, is very similar and the conclusion seems inevitable that the poor showing of the Coloured children is economic in origin. The really surprising thing is that their standards, especially for height, come so near to those of children who enjoy so many of the advantages which they lack. It should be noted too that the feeding habits in the three continents, though they vary widely, do not seem to have much bearing on the rate, pattern or endpoint of the growth of children of comparable lineage.

Finally, the established belief that growth occurs in spurts and that increase in height takes precedence over increase in weight at certain periods of childhood seems to lack any foundation in fact. It is, of course, true that the bodily proportions change from time to time and that some children give the impression of being 'leggy' but though there is a clear difference between the growth pattern of boys and

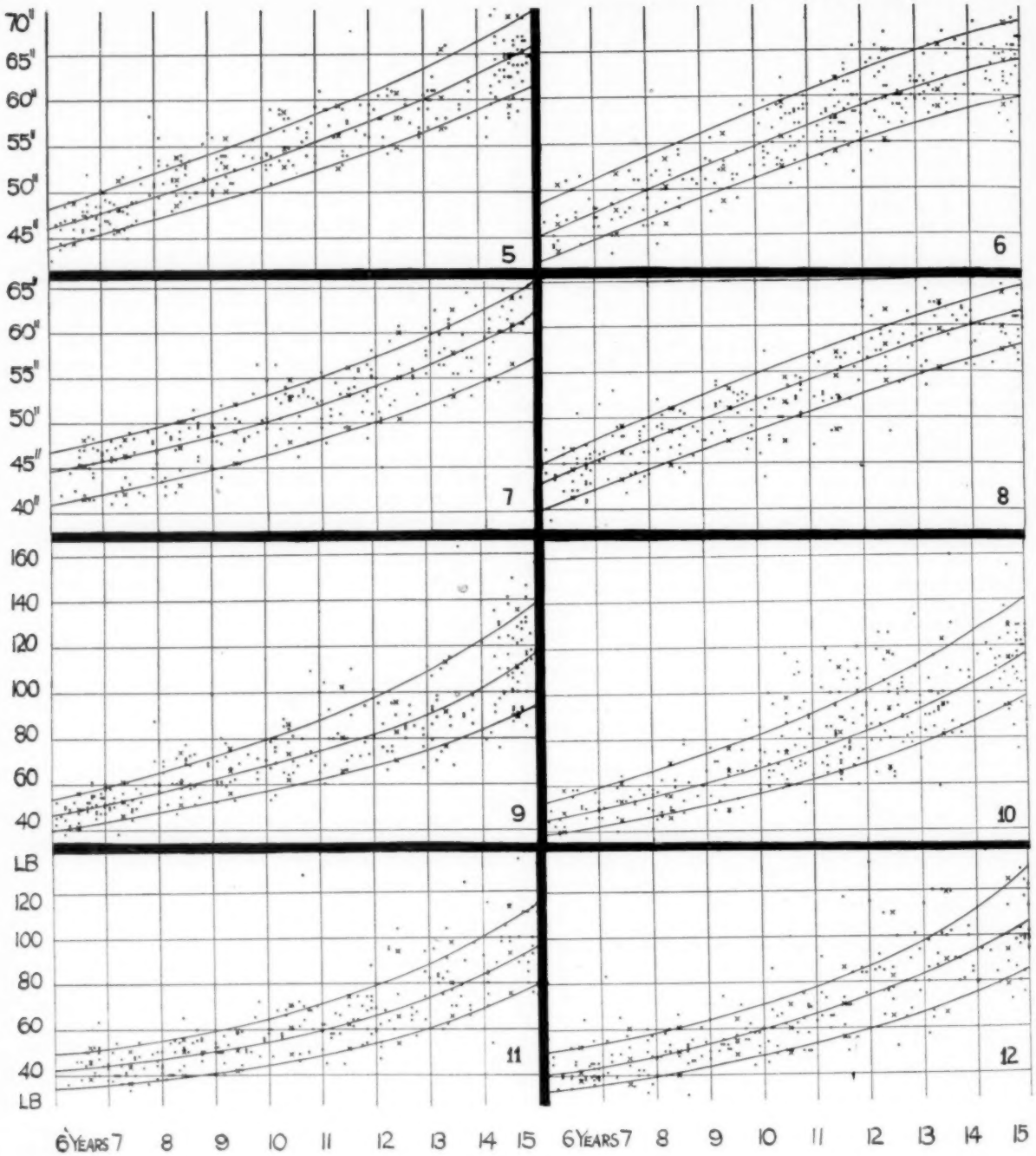

Fig. 5. Height, European boys, Cape Town, 1956.
Fig. 6. Ditto, European girls.
Fig. 7. Height, Coloured boys, Cape Town, 1956.
Fig. 8. Ditto, Coloured girls.

Fig. 9. Weight, European boys, Cape Town, 1956.
Fig. 10. Ditto, European girls.
Fig. 11. Weight, Coloured boys, Cape Town, 1956.
Fig. 12. Ditto, Coloured girls.

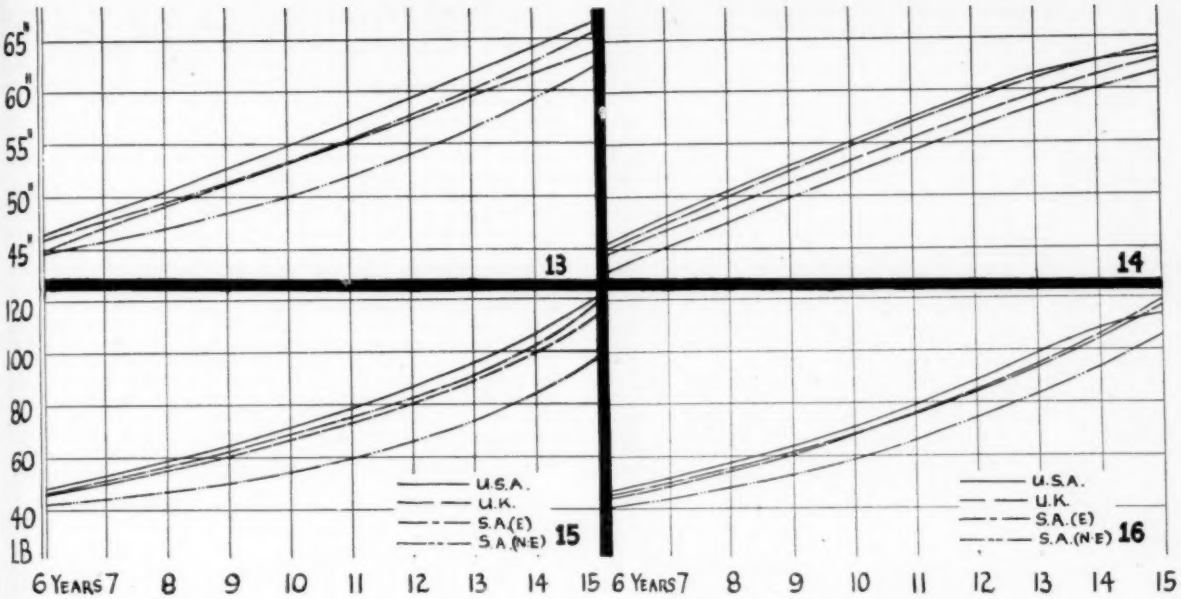

Fig. 13. Comparative chart of boys' heights.
Fig. 14. Comparative chart of girls' heights.
Fig. 15. Comparative chart of boys' weights.
Fig. 16. Comparative chart of girls' weights.

of girls there is never at any time any material cessation or even slowing of the rate of gain in weight. The temporary effect of illness is another matter.

SUMMARY

1. The aim of this survey was to establish the normal range of heights and weights for Cape Town school children of European and Coloured race.

2. The material utilized for this purpose was a random sample of approximately 84,000 European and Coloured school children.

3. The results of the survey are given in graphic as well as tabular form. They show that (*a*) the European boys and girls are both heavier and taller than the Coloured boys and girls at all the ages studied, and that (*b*) the difference is most striking amongst the boys.

4. The Cape Town children have been compared with British and American children of the same ages. The comparison shows that (*a*) there is little difference in the weights and heights of the European children in Britain, USA and Cape Town, and (*b*) the Cape Coloured child lags far behind the European in both height and weight.

5. An incidental finding was that of a fundamental difference in the growth pattern of the sexes, the boys showing an ever-increasing annual gain in height, the girls growing a gradually diminishing amount each year.

APPENDIX

All the material employed in this investigation was extracted from the school medical inspection cards. Only 'normal' children were included and, as some schools had facilities for 'backward' children, their cards were excluded from the sample before the selection of cases was made. All children had been measured and weighed by the school medical officers.

Height. The children were measured in their stockinged feet against a tape measure applied to a wall. All readings were taken to the nearest $\frac{1}{4}$ inch.

Weight. The boys were weighed in trousers and vests whilst the girls wore pants and vests. They were weighed on a portable spring scale and the recordings were made to the nearest $\frac{1}{2}$ lb.

Choice of Schools

At the outset it was decided to analyse the medical inspection cards of 500 European school children. On the advice of a statistician, after the pilot survey more data was necessary and the sample of schools was enlarged. Eventually 983 cards were used.

The list of schools (as supplied by the Chief Medical Inspector of Schools) was placed in alphabetical order, first the high and secondary schools and then the primary schools. The number of pupils in each school was ascertained from the educational statistics for 1954 and the total gave the number of Cape Town European school children as 27,695. As it was decided to visit 15 schools, the school which educated every 1,846th child (27,695 divided by 15) was selected. One of the selected schools is a 'Home of Recovery' and as the aim of the survey was to establish the norm, this school was excluded.

Choice of Medical Inspection Cards

The original intention was to select 3 cards from each age-group in each school to obtain a sample of 50 children in each age-group. Apart from one school, all the cards were arranged in alphabetical order and these cards were sorted into age-groups. The first card from each age group was selected by using a table of random figures whilst the remaining 2 were selected by dividing the remainder of the pile into 3 equal parts and taking the leading card from the rear sections. Where there were insufficient numbers to enable this type of selection, all the cards in the particular age-group were included. This accounts for the inequality of numbers in the various age groups.

At one school the cards were arranged according to school classes. As it would not have been practicable to sort these into age-groups before the selection of cards (difficulty would have been encountered in restoring the original order) it was decided to include 6 cards from each class. The first card was likewise selected from a table of random figures and the remaining 5 by

dividing the remaining pile into 6 equal portions. This latter school contained only boys and accounted for the disproportion in number of boys and girls.

Some schools had recent past-pupils' records included amongst the present pupils' cards, and some of them may have been included in the cards finally selected for the survey.

The sampling for the Coloured children was carried out in the same way, but in the light of experience gained from the European survey, it was decided to select 5 cards from each age-group; 15 schools were again selected but of these 2 had never had a medical inspection and it was not possible to visit a third.

Amongst other information the medical inspection cards include a record of heights and weights of the children at various ages. Each child is examined at least once, and sometimes as many as 5 or 6 times during his school career. From each inspection card only one height and weight recording was extracted and where more than one medical inspection has been carried out, only the most recent recordings were utilized. The child's exact age at the time of the examination is stated on the card, e.g. 10 years and 2 months, etc.

Once all the data had been gathered the information was plotted on 8 graphs (heights of European boys, European girls, Coloured boys and Coloured girls; and weights of the same 4 groups): Figs. 5-12. The median height and weight for each age-group was ascertained, as well as the average age of the children in each age-group. This figure was shown on the graphs by means of a cross. The medians were then joined together and the curve 'smoothed' to give the middle curve on the 8 charts. The 10th and 90th percentiles were calculated and these were likewise shown by a cross on the various graphs. In view of the small number of cases in the survey these percentiles were not so accurate as the median and slightly more 'smoothing' had to be performed when various curves were drawn. The lower and upper curves on the graphs represented the 10th and 90th percentiles and the area between these 2 curves showed the heights and weights of 80% of the children studied.

Tables XIII-XVI show the observed and 'smoothed' readings for the median, 10th and 90th percentiles as read directly from the above-mentioned 8 charts. Tables II-V in the text (those illustrating the median, 10th and 90th percentile of heights and weight of the children) were read directly from the same charts, the height and weight being read off at the point where the curves crossed each year of age.

We wish to acknowledge our indebtedness to Dr. J. G. Meiring, Superintendent General of Education for the Cape Province, and to Dr. L. van D. Cilliers, Chief Medical Inspector for Schools, for permission to make use of the school medical cards; to the principals of the schools selected for sampling for their helpful cooperation in our scheme; to Professor Edward Batson for his generous help in guiding our sampling technique and for the use of his tables; and to the Department's late secretary, Miss J. D. Montgomery, for a vast amount of preparatory work. Mr.

TABLE XIII. ACTUAL OBSERVATIONS AND 'SMOOTHED CURVE' READINGS OF HEIGHT OF CAPE TOWN EUROPEAN CHILDREN (inches)

Age	Boys						Girls					
	P^{10}		Median		P^{90}		P^{10}		Median		P^{90}	
	Obs.	Smth.	Obs.	Smth.	Obs.	Smth.	Obs.	Smth.	Obs.	Smth.	Obs.	Smth.
6– 7	44¼	44½	47	46¾	48¾	49	43½	42	46½	45¾	50½	49½
7– 8	45¾	46	48¼	48½	51¾	50¾	45¼	45	47¾	48½	51¾	52¼
8– 9	48½	47¾	51½	50½	53½	53	46½	47¼	50½	50½	53½	54½
9–10	50½	49½	52½	52	56	55¾	48½	50	52	53½	56	57
10–11	52¾	51½	54¼	54½	58½	57	52¾	52½	55¾	55¾	59¼	59½
11–12	52½	53½	56½	56½	59½	59½	54	54½	57¾	58	62	61¾
12–13	54½	55½	58	58¾	60¾	62	55½	56	59½	59¾	65	63¾
13–14	56½	57¼	60½	61	65½	64½	58¼	57¾	60½	61½	65½	65¾
14–15	59½	60½	64¾	64½	69	68¼	59	59½	63¾	63½	68	67¾

Obs. = Observed. Smth. = Smoothed.

TABLE XIV. ACTUAL OBSERVATIONS AND 'SMOOTHED CURVE' READINGS OF HEIGHT OF COLOURED CHILDREN (inches)

Age	Boys						Girls					
	P^{10}		Median		P^{90}		P^{10}		Median		P^{90}	
	Obs.	Smth.	Obs.	Smth.	Obs.	Smth.	Obs.	Smth.	Obs.	Smth.	Obs.	Smth.
6– 7	41½	41½	45¼	45¼	48	47½	41¼	41¼	44¼	44¼	46½	46½
7– 8	42	42½	46¼	46¼	48¼	48½	43¼	43¼	46¼	46¼	49¼	49
8– 9	43	44	47¼	47½	50¼	50¼	44¾	45¼	48¼	48¼	51	51
9–10	45½	45½	49	49	52	52	47½	47¼	51	50¾	53¼	53¾
10–11	48	47¼	52¾	51	54¾	54	47½	49¾	51¾	53	54½	56
11–12	49½	49½	53	53	56¼	56¼	48¾	51½	54½	55	57	58
12–13	50½	51	55	55	60	58½	54	53½	58	57	61¾	59¾
13–14	53¼	53½	57¾	57½	62½	61	55½	55½	59¾	59	62½	61¾
14–15	56½	56	61	60¼	64	64¾	57½	57½	60	61	63½	64

TABLE XV. ACTUAL OBSERVATIONS AND 'SMOOTHED CURVE' READINGS OF WEIGHT OF EUROPEAN CHILDREN (lb.)

Age	Boys						Girls					
	P^{10}		Median		P^{90}		P^{10}		Median		P^{90}	
	Obs.	Smth.	Obs.	Smth.	Obs.	Smth.	Obs.	Smth.	Obs.	Smth.	Obs.	Smth.
6– 7	41½	41½	49	48½	56	56	40	39½	47	45½	58	55
7– 8	46	45	53	53	61	61	45	44	53	52	61	62
8– 9	51	49½	61	59	74	68	46	48	55	57	69½	68½
9–10	56	54	66	64	76	74½	49	53	66	64½	76	77
10–11	62	59	73½	71	86	83	60	59	73½	71	98	86½
11–12	65½	64½	80	77½	102	92	66	66	82½	79	110½	96½
12–13	70½	70½	82½	85	95½	102	67	72½	93	87	117½	106
13–14	76½	77½	92	94	113	113	82	82	95	97½	123	118
14–15	89½	90½	111	111	136	133	94½	94½	115	112½	129	136

TABLE XVI. ACTUAL OBSERVATIONS AND 'SMOOTHED CURVE' READINGS OF WEIGHT OF COLOURED CHILDREN (lb.)

Age	Boys						Girls					
	P^{10}		Median		P^{90}		P^{10}		Median		P^{90}	
	Obs.	Smth.	Obs.	Smth.	Obs.	Smth.	Obs.	Smth.	Obs.	Smth.	Obs.	Smth.
6– 7	38½	35	46	43½	52	50½	38	34½	41½	42	52	52
7– 8	36½	36½	43½	45½	50½	53	36	37½	47	46	60	56
8– 9	40	39	50	48	56	57	40	41	50	50	61	61
9–10	42	42	51	52	60	61	48½	46	55	57½	64	66
10–11	49	46	61	56½	70	67	49½	51	50	63	70	74
11–12	51	51	62½	63	74	75	56	56½	70	70	86½	82½
12–13	54	56	65½	69	94	83	65	62½	82½	78	110	91
13–14	66	64	80	77½	98	93	66½	70	90	88	119	103½
14–15	75½	74	93	90	113½	107	78½	81	94½	101	124	122

Nolte was responsible for the final preparation of our graphs and 'smoothed' curves.

REFERENCES

1. Kark, E. (1953): S. Afr. Med. J. Sci., **18**, 109.
2. Le Riche, H. (1944): *Manpower*, vol. 3, no. 1, p. 9. Pretoria: Government Printer.
3. Botha, J. F., Clark, D. and Jokl, E. (1945): S. Afr. Med. J., **19**, 381.
4. Philips, H. T. (1953): Arch. Dis. Childh., **139**, 226.
5. Woodrow, E. P. and Robertson, F. (1950): S. Afr. Med. J., **24**, 761.
6. Le Riche, H. (1940): *Physique and Nutrition*, Research Series No. 13. Pretoria: J. L. Van Schaik, Ltd.
7. Brown, H. M. (1935): S. Afr. Med. J., **9**, 819.
8. Freed, I. (1935): *Ibid.*, **9**, 467.
9. Johnston, J. A. in Nelson, W. E., ed. (1954): *Text-book of Pediatrics*, 6th ed., p. 148. Philadelphia and London: W. B. Saunders Co.
10. Illingworth, R. S. in Garrod Batten and Thersfield (1953): *Diseases of Children*, 5th ed., vol. 1, p. 74. London: Edward Arnold & Co.
11. Meredith, H. V. in Nelson, W. E., ed. (1954): *Op cit.*,[9] p. 56.
12. Cluver, E. H., Jokl, E. and Rorich, P. R. (1946): S. Afr. J. Med. Sci., **11**, 45.

CANCER CURER'S CASE BOOK: II

EPITHELIOMA OF THE LIP

J. D. ANDERSON, M.B., B.CH. (RAND), *Registrar, Radiotherapy Department, Groote Schuur Hospital, Cape Town*
From the Combined Clinic, Groote Schuur Hospital

'It has been repeatedly observed that . . . the patient whose rodent ulcer has been treated with cancer paste has received such a trauma to the underlying stroma that radiotherapy is not effective; . . . because of the damage to the stroma the reaction to radiotherapy is also unpredictable, so that normal doses may lead to very extensive sloughing.'[1]

CASE REPORT

A European male aged 28 years was referred to Groote Schuur Hospital on 1 December 1957 complaining of an ulcer on the lower lip as well as an ulcerating area on the right jaw. He stated that, 4 years before, an ulcer appeared on the right lower lip for which he went to his doctor. The doctor took a portion for biopsy and squamous epithelioma was reported. When he heard the diagnosis the patient did not return for treatment but immediately went to see a well-known 'cancer curer', who gave him treatment for 2 years. This resulted in an unhealed ulcer, but by the time he returned to his medical attendant secondary glands had developed in the submaxillary region of the right side. He was referred to a radiotherapist for treatment.

The radiotherapist was aware of the risks involved, but, in view of the fact that excisional therapy was not locally available he decided to give the patient small doses of radiotherapy on two separate areas. He gave 200 r daily to a total of 2,800 r to the submaxiliary glands, and 300 r daily to a total of 3,400 r to the lower lip. This is well within the normal safe limits ordinarily advised for treatment, and the therapist stated in his letter that he did not imagine for a moment that the X-ray therapy would cure the lesion of the lower lip, although he had hoped that if the patient underwent surgery a good result might eventually have been possible.

The lesion did not resolve and the patient did not return to the radiotherapist until several months later. During this time he visited and was treated again by the 'cancer curer' as well as getting a certain amount of attention from witchdoctors. Fourteen days before admission he returned to his doctor, who referred him to Groote Schuur Hospital. The condition on admission showed (Fig. 1) that there was a large carcinomatous ulcer involving the right lower mandible as well as an unhealed carcinoma of the right lip. Snips were taken from these, which showed on report that 'the area was infiltrated by a squamous carcinoma which is only

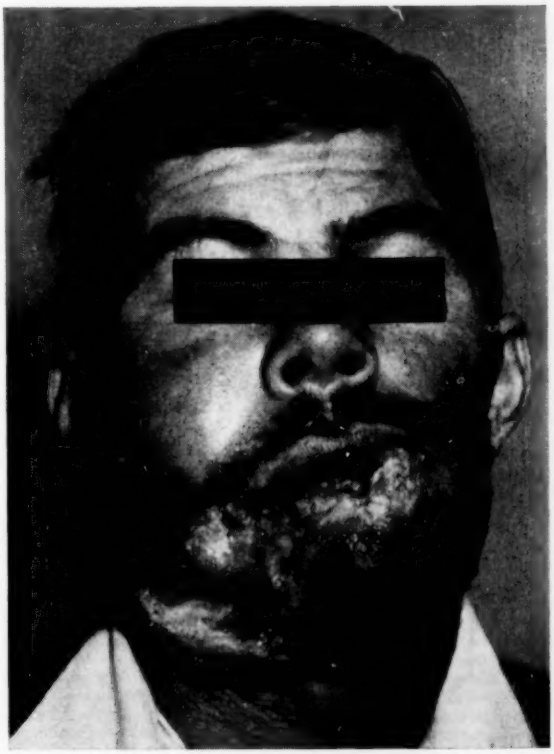

Fig. 1. Condition on admission.

moderately well differentiated and which shows little evidence of keratinization'.

In the ordinary way lesions with this type of histology—not well differentiated and a little anaplastic—respond very well to radiotherapy, but the response in this instance was exaggerated and aggravated by the previous escharotic treatment and was quite overwhelming. The whole of the floor of the mouth as well as the submaxillary area had sloughed away and the mandible was exposed in the wound. Treatment at this stage was quite hopeless and an attempt was made to clean up the area with penicillin and streptomycin. Even at this stage the patient refused to have a biopsy done and this had to be postponed for a week in deference to his wishes. In the meantime, diagnostic X-ray photographs of the mandible and the chest were taken; no pulmonary lesion was seen, but 'there was an osteitis in the region of the symphysis menti without sequestration and extending along the surface of the mandible on the right side'.

The patient who, it will be remembered, was only 28 years old, was sent home with no further treatment advised.

SUMMARY

1. A case is reported of a patient with a moderately anaplastic epithelioma of the lip which responded explosively to cautious radiotherapy after having had previous escharotic treatment by a 'cancer curer'.

2. Neither surgery nor radiotherapy could be offered at that stage because of the extent of the disease, and the patient was referred home without further treatment.

REFERENCE

1. Schrire, T. (1958): S. Afr. Med. J. 32, 520.

ANNUAL GENERAL MEETING OF THE MEDICAL ASSOCIATION : JAARLIKSE ALGEMENE VERGADERING VAN DIE MEDIESE VERENIGING

The Annual General Meeting of the Medical Association of South Africa was held in the Riviera Recreation Hall, opposite the General Hospital, Pretoria, on the morning of 1 October 1958, when Dr. R. Schaffer was inducted as President of the Association by Dr. Harry Grant-Whyte, the retiring President.

Dr. Grant-Whyte referred to the great services which Dr. Schaffer had rendered to the Medical Association, the Border Branch and the public. The appreciation and thanks which he had earned were reflected in his election to the highest honour in the gift of the Association. In his reply, expressing his thanks and appreciation, Dr. Schaffer said that in carrying out the duties of his office he would try to emulate his distinguished predecessors.

At the opening of the meeting the minutes of the last annual general meeting were confirmed and signed and the annual report and audited accounts adopted.

The meeting was adjourned until 8 p.m. After an address of welcome by the Chairman of Federal Council, Dr. J. H. Struthers, Dr. Ian Grant, President of the British College of General Practitioners and a Vice-President of the BMA, who is at present visiting South Africa, addressed the meeting and conveyed greetings from the British Medical Association to the Medical Association of South Africa.

The presentation of the following awards was then made by the President of the Medical Association, Dr. R. Schaffer: Dr. A. Pijper, *in absentia* (silver medal), Dr. R. Schaffer (bronze medal), Dr. L. O. Vercueil (bronze medal), Dr. T. Schneider (bronze medal) and Prof. D. J. du Plessis (Hamilton-Maynard Memorial medal). After the presentation of the awards Dr. Schaffer delivered his Presidential Address. The address was published in the *Journal* of 4 October (**32**, 973).

Die Jaarlikse Algemene Vergadering van die Mediese Vereniging van Suid-Afrika is op 1 Oktober 1958 in die Riviera Munisipale Ontspanningsklub, oorkant die Algemene Hospitaal, Pretoria, gehou. By hierdie geleentheid is dr. R. Schaffer ingelyf as President van die Vereniging deur dr. Harry Grant-Whyte die uittredende President.

Dr. Grant-Whyte het verwys na die groot dienste wat dr. Schaffer aan die Mediese Vereniging, die Tak Grens en aan die publiek bewys het. Die waardering en dank wat hom toekom word weerspieël in die feit dat die hoogste eer wat die Vereniging kan bewys, hom toegeval het. In sy antwoord het dr. Schaffer sy dank uitgespreek en gesê dat hy by die uitoefening van sy pligte sal probeer om sy voortreflike voorgangers na te volg.

By die opening van die vergadering is die notule van die vorige algemene vergadering goedgekeur en geteken en die jaarverslag en die ouditeursverslae is aangeneem.

Die vergadering is verdaag tot 8 nm. Na 'n welkomsrede deur die Voorsitter van die Raad, dr. J. H. Struthers, het dr. Ian Grant, President van die Britse Kollege van Algemene Praktisyns en vise-President van die B.M.V., wat tans op besoek in Suid-Afrika is, die vergadering toegespreek en die groete van die Britse Mediese Vereniging oorgedra aan die Mediese Vereniging van Suid-Afrika.

Toekenning van die volgende medaljes is hierna deur die President van die Mediese Vereniging, dr. R. Schaffer, gedoen: Dr. A. Pijper, *in absentia* (silwer medalje), dr. R. Schaffer (brons medalje), dr. L. O. Verceuil (brons medalje), dr. T. Schneider (brons medalje) en prof. D. J. du Plessis (Hamilton-Maynard-gedenkmedalje). Na die toekenning van die medaljes het dr. Schaffer sy Presidentsrede gelewer. Die rede is in die *Tydskrif* van 4 Oktober (**32**, 973) gepubliseer.

FEDERAL COUNCIL MEETING (M.A.S.A.), PRETORIA, 1-3 OCTOBER 1958

The following is a brief preliminary resumé of *some* of the matters discussed at the 6-monthly meeting of the Federal Council of the Medical Association of South Africa, held in the Riviera Recreation Hall, Pretoria, on 1-3 October 1958. The minutes of this meeting will be published in the *Journal* in due course, in compliance with Rule 37 of the Standing Orders and Rules of Council. The Chairman of Federal Council (Dr. J. H. Struthers) presided. Amongst those present were the President of the Association (Dr. R. Schaffer), the past-President (Dr. H. Grant-Whyte), the Honorary Treasurer (Mr. J. D. Joubert) and the Vice-Chairman (Dr. E. W. Turton), who took the chair during part of the meeting.

Guest Speaker

Dr. Ian D. Grant, President of the British College of General Practitioners and a Vice-President of the British Medical Association, attended the meeting of Federal Council during the afternoon of the 1st day. Federal Council was privileged to hear this distinguished guest speak on the structure of the BMA and its financial affairs and obligations. Regarding the financial affairs of the BMA Dr. Grant said that the B.M.A. has not found it easy to meet its financial obligations since more and more demands are being made by members for services. During the past 2 years the BMA has been 'walking on a tightrope'. The present annual subscription for home members is £6 6s. It has been difficult to meet all obligations on the basis of these subscriptions, but after full discussion the Representative Body decided to extend, and not curtail, its services.

In reply to questions from the floor Dr. Grant said that of the 6 gs. only 10s. 6d. is paid to Divisions, the rest of the money being utilized for Head Office administration. Regarding the relations of the BMA with the *British Medical Journal*, Dr. Grant said that the *Journal* was the official organ of the British Medical Association and that its financial affairs were intimately bound up with the finances of the Association itself. At present the *Journal* is just about a paying proposition. If there were a surplus it would go into general funds and if there were to be a loss the Association would have to make good the loss.

MATTERS ARISING OUT OF THE MINUTES

Enquiry into the Association's Affairs. At the last meeting of Council an *ad hoc* committee was appointed to institute an urgent investigation 'with a view to reducing Head Office expenditure as much as possible compatible with efficiency'. This Committee met on 2 occasions, the first being in Cape Town on 30-31 May 1958 and the second in Pretoria on 7 August 1958. Towards the end of its first meeting the committee drew up a series of 10 recommendations, some of which were capable of immediate attention while others were of necessity referred to Federal Council. At the meeting of Federal Council these recommendations were discussed. Most of the discussion, however, centred around the eighth recommendation, 'That consideration of the question of the advisability of the centralization of the activities of the Head Office, in relation to the terms of reference of the committee, be deferred to a further meeting of the Committee'. After prolonged discussion, into which many members of Federal Council entered, the following motion, proposed by Dr. Schaffer, was put to Council and carried: 'That the question of the transfer of the Head Office to Pretoria be considered at the next meeting of Council and that information as to the financial implications involved in such a transfer be placed before the Council at the meeting by the Executive Committee.'

Economics of Medical Practice. At the close of the last meeting of Federal Council notice of motion was given by Dr. Sichel: 'That the resolution of Federal Council relating to the sponsorship of the Medical Association to the proposed Medical Insurance a plan put forward by the sub-committee on the economics of medical practice be reviewed and rescinded.' During the ensuing discussion Dr. M. Shapiro reported satisfactory progress of the medical insurance plan and added that sponsorship of the Association, which did not include any financial obligation, was essential for the success of the scheme. This matter gave rise to considerable discussion and eventually it was agreed to drop Dr. Sichel's motion.

South Eastern Transvaal and Swaziland Division: It was decided to advise transfer of this division to the East Rand Branch.

Medical Inspection of Nursery Schools: A memorandum on medical inspection of children in nursery schools was prepared by Dr. Seymour Heymann on behalf of the Southern Transvaal Branch Council. Federal Council resolved to accept the following recommendations made in this memorandum:

A. *Approved non-profit-making nursery schools.* 1. Nursery schools unable to afford payment for medical services should endeavour in the first instance to obtain in an honorary capacity the services of suitably qualified medical personnel either in full-time employment in Municipal, Provincial or other services, or alternatively retired from medical practice. In large towns the example set by the Johannesburg Municipal Health Department in appointing a medical officer to undertake the required medical examinations at approved non-profit making Nursery Schools, could well be followed and should be encouraged.

2. In the event of such personnel not being available to nursery schools, permission for the appointment of honorary medical officers recruited from the ranks of practising doctors should be sought from the local Branch Council of the M.A.S.A. (or Division) and these Councils would be expected to deal with these requests sympathetically.

According to the particular circumstances prevailing, and if the Branch Council is reasonably assured that full-time personnel cannot be secured, the nursery school and the Branch Council should conjointly evolve an appropriate method for securing medical personnel from among doctors engaged in private medical practice.

Posts should be advertised, according to prescribed formula. Consideration could possibly be given to the appointment of a roster of doctors if more than one doctor were to apply and be found suitable.

It would be desirable for the Nursery School Association to sponsor the individual schools' requests for such honorary appointments.

B. *Nursery schools conducted as private enterprises for gain.* The need for medical inspection in these schools is not so manifestly important. However, if the school is desirous of having a medical officer, it should employ a doctor for whose services a salary should be paid. The post should be advertised and the terms of the contract, as also the necessity for the appointment, should receive the prior approval of the appropriate Branch Council in the usual manner.

Suitable safeguards will have to be laid down for doctors in private practice who are appointed as medical officers to nursery schools.

FINANCIAL MATTERS

Notice of motion—raising of subscriptions. For a long time it has been felt that many members are being lost by the Medical Association either by resignation or through doctors not joining the M.A.S.A. A motion regarding the raising of subscriptions proposed by Dr. W. Waks and Dr. M. Segal was discussed as well as a memorandum on the subject by Dr. L. L. Alexander. At the end of the discussion the following motion by Dr. M. Shapiro was carried: 'That a sub-committee be appointed to investigate the practicability of a sliding scale of subscriptions to the Association.' Mr. J. D. Joubert, Mr. J. A. Currie and Dr. A. Landau were appointed to the sub-committee with powers to co-opt additional members.

Report of the Honorary Treasurer. The Honorary Treasurer, in presenting his interim financial report, said that an uneasy spirit still prevailed concerning the financial circumstances of the Association, but that it was hoped that 1959 would prove a better year when the subscriptions would have been raised to 4 gs. So far there have not been many resignations and it is to be hoped that if any member resigns he will not only be written to by the Head Office but will also be approached by the local Branch or Division Executives so that the situation can be explained by personal contact in an effort to try to prevent him from resigning.

The response to the special appeal for donations has been fair and a sum of over £1,000 has been received. Some members have given generously and have written appreciative notes. The Treasurer also said that he had budgeted for a loss of approximately £9,000 for the current year, but that the loss would probably be less. After the Honorary Treasurer had presented his interim report the Chairman asked the Assistant Editor to make a statement on the financial affairs and the editorial policy of the *Journals* of the Association. Dr. Blignault said that the financial affairs of the *Journals* were basically sound; that the loss at the end of this year would be appreciably less than at the end of last year, and that, provided no unforseen radical changes occurred, both the *Journals* of the Association should show a small surplus for 1959.

EXECUTIVE COMMITTEE

The following were amongst the matters dealt with in the report of the Executive Committee:

Open Panel Policy. A memorandum giving guidance to Branches regarding the practical difficulties which may be met in connection with the open-panel policy was drawn up. This memorandum was considered and accepted by Federal Council and it will be forwarded to the Secretaries of Branches for their guidance.

Closed panel appointments in relation to medical ethics. This matter has been discussed by the Parliamentary Committee and certain recommendations were put forward. After a long discussion, Federal Council resolved that these recommendations were not fully satisfactory and, because the problem of closed-panel appointments was such an important problem, the matter was referred back to the Parliamentary Committee for further consideration.

Re-organization of the Association. The *ad hoc* Committee appointed by the Executive Committee of Federal Council, consisting of Dr. A. W. S. Sichel (Chairman), Mr. J. A. Currie, Dr. A. Landau and Mr. J. D. Joubert, met on 2 occasions to consider the original suggestions put forward, together with further suggestions made by certain members of Federal Council. Federal Council resolved that the consideration of the question of re-organization be postponed to the next session of Council.

Secretarial work of the two Association offices. This matter was the subject of a long and lively discussion, at the conclusion of which the following motion, proposed by Mr. J. D. Joubert and seconded by Dr. M. Shapiro, was carried: 'That the Executive Committee be instructed to consider immediately ways and means of transferring the contract practice work to Pretoria as soon as possible.'

JOURNAL

Resignation of Editor. Federal Council accepted with regret the resignation of Dr. T. Shadick Higgins as Editor of the *South*

African Medical Journal, to take effect on 31 December 1958 and the Council expressed its sincere appreciation of the great services which Dr. Higgins has rendered to the Association.

After a short discussion it was resolved that the post of Editor be advertised and that the Executive Committee be empowered to make an appointment and get confirmation from the Council. It was further resolved that the question of the appointment of Assistant Editor be referred to the Executive Committee for consideration.

PARLIAMENTARY COMMITTEE

The following were amongst matters dealt with in the report of the Parliamentary Committee:

Availability of tetanus toxoid to local authorities. Federal Council agreed that the opinion of the Paediatric Group and the M.O.H. Group be obtained and that these opinions be made available to Dr. S. Heymann for the preparation of a memorandum for consideration by Federal Council. Dr. Heymann was also given authority to discuss the matter with Dr. E. H. Cluver, Head of the South African Institute for Medical Research, Johannesburg.

Postgraduate study course—extension of Income Tax concessions already granted. It was reported to Federal Council that the Assistant Secretary (Transvaal) had discussed a request from the Cape Western Branch—that special provision be made for Income Tax rebates for medical persons who are invited to attend world congresses and deliver lectures abroad—with the Department of Inland Revenue and that the Department had intimated that it was not prepared to consider attendance at world congresses, or the delivering of lectures abroad, as constituting an 'approved study course'. Federal Council agreed to accept that further recommendation regarding this matter be not pressed.

Registration of medical auxiliaries. At a previous meeting Federal Council resolved to refer the matter of registration of medical auxiliaries to the Parliamentary Committee for consideration. In considering this matter, the Parliamentary Committee took the following steps:

1. All Branches as well as all National Groups were requested to comment on the matter.
2. The Parliamentary Committee requested (*a*) Dr. Waks to prepare a memorandum setting out the points in favour of voluntary registration, (*b*) Dr. M. Shapiro to prepare a memorandum setting out the points against either voluntary or compulsory registration and (*c*) Dr. Grundlingh to prepare a memorandum setting out the points in favour of compulsory registration.
3. The Committee also obtained from the Medical Council certain relevant information.
4. The Committee obtained an interview with the Auxiliaries Sub-Committee of the Medical Council.

The Parliamentary Committee recommended to Federal Council that the Medical Council be informed that the Medical Association of South Africa (1) favours the principle of registration of medical auxiliaries, (2) considers that this registration should be voluntary and (3) considers that the register should be kept by the South African Medical and Dental Council.

After a prolonged discussion the following amendment, proposed by Dr. M. Shapiro, was carried: '(1) That there is a difference of opinion in the Council regarding the principle of registration of medical auxiliaries, and (2) that in the event of a register being maintained it is the opinion of this Council that such a register should be voluntary and should be kept by the South African Medical and Dental Council'.

CONTRACT PRACTICE

New Medical Aid Societies. The following were added to the list of approved Medical Aid Societies: Max Engineering Medical Aid Fund, Mosenthal's Staff Medical Aid Society, Pilkington Group European Medical Aid Scheme. The following were added to the list of approved Benefit Societies granting free choice of specialist: Brakpan Power Station Medical Benefit Society, Tweefontein Colliery Employees Benefit Society and Tongaat Sugar Company Medical Benefit Scheme. The following were removed from the list: Caltex (South Africa) Medical Aid Society and Hume (Transvaal) Medical Benefit Society. Approval was granted to amendments to the constitutions of a number of Medical Aid Societies.

Consulting and visiting fees for general practitioners. The new scheme of fees which was published in the *Journal* of 30 August was accepted and confirmed.

Fees paid by approved Medical Aid Societies for the materials used by anaesthetists. It was agreed by representatives of the Societies that when the tariff was drawn up there had been an understanding that anaesthetists could charge for materials where these were not provided by the hospital or nursing home and they had no objection to the necessary amendments being made to the tariff for anaesthetists. Federal Council agreed to accept the recommendation of the Central Committee for Contract Practice that a note be inserted at the end of the section for anaesthetists—Section V (*b*)—of the tariff of fees to read, 'the charges listed above do not include the cost of materials'.

Specialist fees for confinements. In reply to a request to draw up a list of fees for various abnormalities for which they might be called in by general practitioners attending Medical Aid Society patients, the South African Society of Obstetricians and Gynaecologists stated that they were not prepared to draw up a list and that members of the group would give consideration to each case and charge fees in keeping with the preferential fees for Medical Aid Societies. Federal Council noted that the Contract Practice Committee considered that the reply from the Group should be accepted.

Relation of the Medical Association to Medical Aid schemes operated by Insurance Companies. The Central Committee for Contract Practice recommended to Federal Council to take steps to appoint and authorize a committee to meet the representatives of medical insurance schemes for exploratory purposes. The Executive Committee of the Central Committee for Contract Practice was appointed to form this Committee.

The next meeting of Federal Council it was decided to hold in Johannesburg.

SOUTH AFRICAN FACULTIES OF THE COLLEGE OF GENERAL PRACTITIONERS

Dr. W. A. M. Miller, Chairman, National General Practitioners Group of the Medical Association of South Africa, has addressed the following letter dated 3 October 1958 to the Hon. Secretary of Council, The College of General Practitioners, London:

At a meeting of the Executive Committee of the Group, held in Pretoria on the evening of 30 September last, and which had the honour of being addressed by Dr. Ian D. Grant, The President of the College of General Practitioners, it was unanimously decided that the Group would sponsor the formation of a College of General Practitioners in South Africa, using the facilities offered by the College of General Practitioners in Great Britain.

Delegates to the Executive Meeting are now returning to their own Provinces, from whence they will shortly be writing to you, submitting applications for membership of the College and requests that they be allowed to form Faculties in their areas.

When sufficient Faculties have been formed, the National General Practitioners Group will apply for the formation of a South African Council; and in the course of time when the South African Council is sufficiently strong the National General Practitioners Group will withdraw and leave them to run their own affairs.

The upsurge of enthusiasm resulting in the Union-wide desire to form Faculties of the College has been very largely due to the exceptional qualities, personality and tirelessness of Dr. Ian Grant, your President, who has not spared himself in the course of a very strenuous tour, for which we are all most grateful to him, and to your Council, who has spared him from his duties that he might undertake the visit.

I have been instructed that an initial Group has already decided to apply for membership so that the formation of a Faculty might be proceeded with in the shortest possible time, here on the Reef, and I have no doubt that similar Faculties will be formed in other centres with the same speed.

WMA ASSEMBLY REAFFIRMS PRINCIPLES OF MEDICAL CARE

The World Medical Association recognizes and supports only those medical care systems provided by Social Security that are approved by the national medical association of the country in which the system operates. In 1948 the Association adopted Twelve Principles to govern Social Security plans that include medical care. Governments and Social Security organizations frequently develop and try to impose medical care plans that violate these Principles and therefore are not acceptable to the medical profession of the country.

The XIIth General Assembly meeting in Copenhagen, Denmark, in August 1958 received reports on medical care plans developing under Social Security systems in Italy, Japan and Peru to which the national medical association in each of these countries could not subscribe since these plans violated the principles governing (1) Free choice of doctor, (2) Freedom to prescribe medication and type of treatment, (3) Professional secrecy, (4) Professional autonomy and liberty.

The Assembly reaffirmed its firm belief that whenever medical care is provided as part of the Social Security system provisions must be made to provide (1) Free choice of doctor by the patient, (2) No intervention of a third party between the doctor and patient, (3) No restriction of medication or mode of treatment by the doctor, (4) That there shall be no exploitation of the doctor, the doctor's services or the public by any person or organization.

The XIIth General Assembly supported the complainant member associations for refusing to accept the plans of medical care services under Social Security plans that violated these, or any other of the Twelve Principles governing medical care.

1959 MEETING SCHEDULE

The WMA announces the following schedule of meetings for 1959:

35th Council Session, Sydney, Australia, 25 March to 4 April 1959.

Second World Conference on Medical Education, Chicago, Illinois, 30 August to 4 September 1959. Theme: *Medicine—A Lifelong Study*.

XIIIth General Assembly, Montreal, Canada, 7-12 September 1959. Additional information on these meetings available from The World Medical Association, 10 Columbus Circle, New York 19, New York.

PASSING EVENTS : IN DIE VERBYGAAN

Dr. J. Fine, of Johannesburg, has left for overseas and will return towards the end of November.

* * *

Dr. Morris Medalie, M.R.C.P.E., Diseases of Children, has moved from Medical Centre to 605 Osler Chambers, Jeppe Street, Johannesburg. The telephone numbers remain unchanged.

* * *

The Annual Congress of the South African Orthopaedic Association will take place in Johannesburg from 23 to 25 October 1958. The various sessions will be held at Medical House, Esselen Street, and in the Harveian Lecture Theatre at the Medical School, commencing at 9 a.m. on Thursday 23 October.

* * *

Mr. Joseph Block, F.R.C.S. (Eng.), Neurosurgeon at the Baragwanath Hospital, Johannesburg, has not moved to Bloemfontein as stated in the Southern Transvaal Newsletter of September 1958. Mr. Block still holds his appointment at Baragwanath Hospital and has no intention of moving to Bloemfontein.

* * *

Northern Areas Division, Cape Western Branch. The business meeting to be held in the Old Council Chamber, Klosser Street, Parow on Thursday 23 October 1958 will concern itself with medical fees in private practice and the election of scrutineers for the annual election of office bearers.

* * *

Cape Western Branch (M.A.S.A.): The monthly meeting of this Branch will be held in the Physiology Lecture Theatre, Medical School, Observatory, Cape, at 8.15 p.m. on Friday 31 October 1958. Prof. F. J. Ford, professor of Child Health at the University of Cape Town will address the meeting on 'Infant Feeding'.

* * *

Research Forum, University of Cape Town. The next meeting of Research Forum will be held on Wednesday 5 November 1958 at 12 noon in the large A-floor lecture theatre, Groote Schuur Hospital, Cape Town. Dr. W. P. U. Jackson will speak on 'Hypercalciuria with special reference to sarcoidosis and the action of Vitamin D'. All interested are invited to attend.

* * *

Dr. H. Gruebel Lee, Dermatologist, wishes to inform his colleagues that in addition to his rooms at 126 Lister Building, Jeppe Street, he has opened rooms at 102 Southern Medical Centre, Rosettenville, Johannesburg. Telephone: 26-2650.

Dr. H. Gruebel Lee, Dermatoloog, wens sy kollegas in kennis te stel dat hy bykomstige spreekkamers te Southern Medical Centre 102, Rosettenville, Johannesburg, geopen het. Telefoon: 26-2650.

* * *

Dr. Louis F. Freed, M.A., M.D., D.Phil., D.P.M., F.R.S.S.Af., of Johannesburg, has been invited by Prof. Dr. H. Thomae, Director of the Psychological Institute of the University of Erlangen, Germany, to serve as South African Editor of *Vita Humana*, International Journal of Human Development, published by Verlag S. Karger AG., Basle, Switzerland. Dr. Freed is lecturer in the Department of Psychiatry of the University of Witwatersrand.

* * *

Willem Steenkamp, Chirurg van Kaapstad, het so pas teruggekeer van 'n nagraadse toer na die Verenigde State en het sy praktyk hervat in Volkskas-Gebou, Adderleystraat.

Willem Steenkamp, Surgeon, Cape Town, has just returned from a postgraduate trip to the United States and has resumed practice at Volkskas Building, Adderley Street.

Cape Western Branch (M.A.S.A.) and the University of Cape Town Medical School. A special meeting will be held in the Physiology Lecture Theatre, Medical School, Observatory, Cape, at 8.15 p.m. on Tuesday 21 October 1958 when Prof. H. C. Rümke, professor of psychiatry at the University of Utrecht, will lecture on 'The Psychic Disturbances of the Normal Human Being'. Professor Rümke is visiting South Africa at the invitation of the Department of Education, Arts and Science. He is a past chairman of the Dutch Association for Psychiatry and Neurology, past principal of the University of Utrecht and past president of the World Federation for Mental Health, of which he is still chairman of the Scientific Committee.

* * *

The Alexander von Humboldt-Stiftung awards *scholarships* for postgraduate studies at universities and research institutes in the Federal Republic of Germany and in West Berlin.

The scholarships are given to highly qualified and well recommended young foreign scholars, who already have completed their studies at an institution of higher learning. They should in their own country either be regarded as future professors, as scientists at research institutes, or as leaders in other fields. Students in the field of medicine should have completed their required medical training.

Applicants should have an adequate command of the German language.

Applicants should not be older than 30 years. They cannot be accompanied by their dependents during their stay in the Federal Republic of Germany unless the grantee has sufficient private means available for their support.

The scholarships provide for an amount of DM 400 per month. University and institution fees are paid for by the *Stiftung*. The premiums for health and accident insurance of DM 30 per semester have to be paid by the scholar. The cost for inland railway transportation from the port of entry in Germany to the institution of affilation and return will be paid by the *Stiftung*.

The scholarships are awarded in general for a period of 10 months for the academic year, beginning 1 October and ending

31 July. An extension of the scholarship for another 10 months is possible but once.

Applications *in triplicate* must be directed to Mr. O. M. Neubert, Embassy of the Federal Republic of Western Germany, P.O. Box 2023, Pretoria (telephone 3-5291). The closing date for receipt of applications is 15 November.

* * *

Unie van Suid-Afrika, Departement van Gesondheid. Nuusbrief nr. 40 *van* 1958. Opgawes van gedugte epidemiese siektes en poliomiëlitis in die Unie gedurende die tydperk 26 September tot 2 Oktober 1958.

Pes, Pokkies, Tifuskoors. Geen.

Poliomiëlitis

	Bl.	*Nat.*	*Kl.*	*As.*	*Totaal*
Transvaal	2	1	–	–	3
Kaapprovinsie ..	–	4	1	–	5
Oranje-Vrystaat ..	–	–	–	–	–
Natal	–	1	–	–	1
Totaal	2	6	1	–	9

Korreksie:

Transvaal: Een (1) Naturellegeval wat in Nuusbrief Nr. 35 van 1958 vermeld is, word nou gediagnoseer as ‚nie poliomiëlitis'.

Plaaslike Besture	*Bl.*	*Nie-bl.*
Transvaal:		
Germiston-munisipaliteit .. .. S	1	
Johannesburg-munisipaliteit .. S	1	
Klerksdorp-munisipaliteit .. .. S		1
Kaapprovinsie:		
Bathurst-afdelingsraad .. .. P		1
Bedford-munisipaliteit .. .. S		1
Kaapstad-munisipaliteit .. .. S		1
Port Elizabeth-munisipaliteit .. S		2
Natal:		
Ixopo-distrik .. .. P		1

Korreksie:

Transvaal: Een (1) Naturellegeval vanuit die distrik Rustenburg, wat in Bylae tot Nuusbrief Nr. 35 van 1958 vermeld is, word nou gediagnoseer as ‚nie poliomiëlitis'.

P= Plattelands. S= Stedelik

NEW PREPARATIONS AND APPLIANCES : NUWE PREPARATE EN TOESTELLE

DEANER

Die Riker-Laboratorium het onlangs 'n nuwe anti-bedruktsheidsmiddel (Deaner) op die mark gebring. Die volgende besonderhede word oor hierdie middel verskaf: Die middel lei tot 'n toename in geesteskrag en energie wat weerspieël word in verhoogde dryfkrag, konsentrasievermoë en 'n gevoel van welsyn. Die middel is getoets in 1,300 persone sonder dat enige nadelige gevolge waargeneem is. Deaner (2-dimetielaminoëtanol) is 'n hormone wat 'n biochemiese korrektiewe uitwerking veral op breinselle het. Dit is normaal aanwesig in die liggaam, maar wanneer dit in terapeutiese hoeveelhede toegedien word, lei dit tot verbeterde biologiese funksies. Die middel kan per mond geneem word, maar dit kan twee of meer weke neem om die volle uitwerking te hê. Wanneer die behandeling gestaak word, is daar geen skielike verlies van die uitwerking daarvan nie. Die middel is veral aangewese by ligte bedruktheidstoestande en kroniese moegheid, en die uitwerking is geleidelik sonder om oormatige prikkelbaarheid, bewerigheid of emosionele spanning te veroorsaak, sonder om oormatige motoriese werking te veroorsaak, sonder om verlies van eetlus te veroorsaak, sonder om die bloeddruk of hartspoed te verhoog en sonder plotselinge agteruitgang wanneer terapie eindig.

Die dosismaat is aanvanklik 25 mg. daagliks in die oggend. Daarna is die gereelde dosis 1-3 tablette daagliks vir volwassenes.

REVIEWS OF BOOKS : BOEKRESENSIES

AUTONOMIC DYSPRAXIA

Autonomic Dyspraxia. An Hypothesis for the Mechanism of Psychosis, Neurosis and Psychosomatic Disease. By Brian G. Haynes, M.B., B.S., M.R.C.P. Pp. viii+122. 15s. net. London: H. K. Lewis & Co. Ltd. 1958.

The author has coined the term 'autonomic dyspraxia' to replace the term neurosis, but this label is applied to a great many more conditions than is customarily comprehended and includes, among others, fibroids, ectopic gestation, intermittent claudication, angina pectoris, coronary occlusion, diabetes mellitus etc. etc. He says that he 'does not propose to detail and discuss the data in each of the listed conditions. The data is too complex and varied to be used profitably by the current statistical methods . . . The human mind . . . can serve as a more satisfactory instrument'. In a chapter entitled 'Instrumental Signs' he mentions electroencephalography and says 'epilepsy is a neurovascular disease resulting from autonomic dyspraxia . . . the pattern of the EEG and the associated epileptic phenomenon will depend on the site in the cerebral vasculature where spasm occurs, and consequently the extent of the cerebral ischaemia. In *grand mal* the site will be centripetal, involving large calibre vessels with widespread ischaemia. In *petit mal* smaller vessels will be found to be involved'. He has this to say about prognosis: ‚prognosis is usually hopeless if seven, seventeen or similar number of doctors have already failed to cure her . . . If the therapeutic arpeggio includes shock treatment or such a *piece de resistance* as a pilgrimage to the Mayo Clinic, the prognosis is beyond doubt.' Some two thousand years ago Hippocrates said: 'There are, indeed, two things, knowledge and opinion, of which one makes its possessor really to know, the other to be ignorant.' The book is not recommended.

S.B.

CORRESPONDENCE : BRIEWERUBRIEK

DISPUTE OVER A CONTRACT PRACTICE FEE

To the Editor: I believe the Medical Association intends increasing its subscription, and is also appealing for donations. The following little incident makes the Association as at present run just a little malodorous, to say the least.

Mrs. X living 500 miles away is referred by her benefit-society doctor in her town to a Johannesburg otologist. The latter wanted an immediate opinion from a physician and referred her direct to this specialist without attempting to communicate with her G.P. in the town 500 miles away. The benefit society concerned abruptly refused to pay the account of the physician, because the case was not referred direct to the physician by the G.P.

The Medical Association was written to, and after 18 months' delay an *ex cathedra* statement by somebody who runs an enormous partnership panel and who, apparently, has the only say and who, it appears to me, did not grasp the situation to the slightest extent, ruled that all cases must be referred by the family doctor, and condoned the refusal of the society to pay the fees.

Need I write any more?

The Physician Concerned

7 October 1958

[This dispute was referred by the Southern Transvaal Branch to the Central Committee for Contract Practice, whose report on the subject was debated and accepted by Federal Council. The following passage is taken from the report: ' . . . The Society repudiated liability because, contrary to the rules of the Society, the member had consulted a specialist without prior reference to the general practitioner. The specialist had then referred the patient to another specialist, who now complained of non-pay-

ment of his account. In addition the specialist had allowed more than 6 months to elapse before drawing the attention of the Society to the fact that his account had not been paid. The Committee agreed that the Society could not be held responsible for the account. . . . '—*Editor*]

DR. IAN D. GRANT'S FAREWELL

To the Editor: At the invitation of the General Practitioners Group of the Medical Association of South Africa I have had the privilege of visiting the principal cities of the Union and talking to many of my colleagues about the aims and objects of the College of General Practitioners. May I express my sincere and grateful thanks to all those members of the Association and their wives who by their wonderful hospitality and many personal kindnesses made my visit so enjoyable. I have made many new friends, whom I shall hope to welcome to Britain in the near future. May I assure you that I carry back with me to Scotland the happiest memories of this great country and its warm-hearted and generous people.

Ian D. Grant
President, College of General Practitioners

Johannesburg
4 October 1958

ACTION OF CHLOROTHIAZIDE

To the Editor: From the paper of Saunders and Eales[1] in the issue of 20 September, together with their quoted reports and more recent work,[2–4] the indications are that chlorothiazide (Chiotride; Saluric; Diuril) has great promise as a safe, effective oral diuretic. Its mode of action has also received further clarification. Although initially stated to have 30 times the carbonic-anhydrase inhibitory activity of acetazoleamide (Diamox) *in vitro*,[5] such action is not marked *in vivo* and the major diuretic effect is due to increased sodium and chloride excretion. Assay of the *in vitro* action of a series of carbonic-anhydrase inhibitors by the method of Philpot and Philpot[6] indicated that chlorothiazide had about 1/10th the activity of acetazoleamide. Recently the original finding of the great carbonic-anhydrase inhibitory action of chlorothiazide *in vitro*[5] was modified by the same authors,[7] who concluded that its activity was far less than that of acetazoleamide. We would emphasize this conclusion, since the supposed difference between the *in vitro* and *in vivo* activity of chlorothiazide is widely stressed in current literature.

In controlled experiments on subjects with normal cardiorenal function, the renal carbonic-anhydrase inhibitory action of chlorothiazide was about 1/4th that of acetazoleamide (the most potent inhibitor) in maximal oral doses, as judged by the enhancement of urinary bicarbonate excretion;[8] the simultaneous increased chloride excretion was almost equivalent to the increased sodium excretion for chlorothiazide, while the chloride excretion was virtually unchanged with acetazoleamide.

Drugs with a purely carbonic-anhydrase inhibitory action, such as acetazoleamide (Diamox), acetazolineamide (Neptazane), p-sulphamyl benzoate (Dirnate), diphenyl disulphonamide (Nirexon) and ethoxzolamide (Cardrase) have a limited usefulness as diuretics, owing to an automatic self-regulating limitation of bicarbonate diuresis.[8,9] A fixed metabolic acidosis was produced, with resistance to further action of the drug. In addition, owing to the greater availability of body chloride compared with bicarbonate, the maximum action of a renal carbonic-anhydrase inhibitor can only be about 1/3rd as effective as a diuretic inhibiting tubular reabsorption of chloride (e.g. chlorothiazide, mercurials). Pitts *et al.*[10] have shown that chlorothiazide and chlormerodrin (mercurial—Mercloran), given to dogs in combination in doses sufficient individually to cause maximal effects, produced additive responses. Hence the conclusion is that chlorothiazide and chlormerodrin either block separate mechanisms for tubular reabsorption of sodium and chloride or possibly interfere with different metabolic systems supplying energy to a single reabsorptive process.

Thus the theoretic and practical advantages of chlorothiazide as a diuretic are considerable. (Other compounds with dual carbonic-anhydrase inhibition and enhanced chloride excretion have since been synthesized.[7]) Further, chlorothiazide tends to increase potassium excretion less than acetazoleamide. However, high doses of chlorothiazide enhance potassium excretion, but the possibility of potassium depletion can be countered by oral potassium supplements. The dangers of potassium deficiency are particularly evident in patients on a low sodium intake, since urinary potassium then forms a major fraction of the cation excretion.

As yet unexplained is the potentiation by chlorothiazide of the antihypertensive action of various agents currently employed in the treatment of essential hypertension.[11,12] There are, however, observations of a primary effect of chlorothiazide on vascular reactivity and systemic haemodynamics.[13,14]

Ralph E. Bernstein

Electrolyte and Metabolic Research Unit
South African Institute of Medical Research, Johannesburg
7 October 1958

1. Saunders, S. J. and Eales, L. (1958): S. Afr. Med. J., **32**, 934.
2. Matheson, N. A. and Morgan, T. N. (1958): Lancet, **1**, 1195.
3. Watson, W. C., Thomson, T. J. and Buchanan, J. M. (1958): Lancet, **1**, 1199.
4. Ford, R. V., Rochelle, J. B. III, Handley, C. A., Moyer, J. H. and Spurr, C. L. (1958): J. Amer. Med. Assoc., **166**, 129.
5. Beyer, K. H., Baer, J. E., Russo, H. F. and Haimbach, A. S. (1957): Fed. Proc., **16**, 282.
6. Philpot, F. J. and Philpot, J. St. L. (1936): Biochem. J., **30**, 2191.
7. Russo, H. F., Beyer, K. H., Baer, J. E. and Haimbach, A. S. (1958): Fed. Proc., **17**, 407.
8. Bernstein, R. E. (1958): S. Afr. J. Med. Sci., **23**(3), in press.
9. Hanley, T. and Platts, M. M. (1956): J. Appl. Physiol., **9**, 279.
10. Pitts, R. F., Krück, F., Lozano, R., Taylor, D. W., Heidenreich, O. P. A. and Kessler, R. H. (1958): J. Pharmacol. Exp. Ther., **123**, 89.
11. Hollander, W. and Chobanian, A. V. (1958): J. Clin. Invest., **37**, 902.
12. Heider, C., Dennis, E. and Moyer, J. H. (1958): Ann. N.Y. Acad. Sci., **71**, 456.
13. Beavers, W. R. and Blackmore, W. P. (1958): Proc. Soc. Exp. Biol., **98**, 133.
14. Crosley, A. P. Jr., Castillo, C., Freeman, D. J. and White, D. H. Jr. (1958): J. Clin. Invest., **37**, 887.

PARENTERAL MAGNESIUM SULPHATE IN CORONARY ARTERY DISEASE

To the Editor: In a paper published in September 1956 we reported that, on the basis of clinical observations spread over a period of 23 years, intramuscular injections of magnesium sulphate clinically benefited an appreciable number of sufferers from angina pectoris due to coronary artery disease and that a number of patients so treated showed a reduction of their raised beta-lipoprotein fraction.[1] Several reports have since been published which stated that the use of parenteral magnesium sulphate was clinically justified.[9–7] All these publications, including our own, dealt only with private patients.

In a recent paper in your *Journal* Drs. Sandler and McGregor[8] record the result of their trial with this form of therapy on 16 hospital cases selected on the 'sole criterion of suffering from angina of effort due to coronary heart disease'. The effect of magnesium sulphate and a 'placebo' (saline) was compared by means of the 'double-blind technique'. Their trial was conducted over a period of only 8 weeks. They report that, of the 8 patients who first received magnesium sulphate, 6 (or 75%) showed subjective improvement. As regards biochemical changes a reduction of more than 25 mg.% in the level of beta-lipoprotein cholesterol (which incidentally reflects a marked decrease) was observed in 5 cases, i.e. in 31% of cases treated. Nevertheless they concluded: 'No very striking trends were observable in the pattern of blood lipids or lipoproteins . . . Subjective improvement was very great with magnesium sulphate but just as great with the placebo.'

Because of the source from which this paper emanates—the Department of Medicine of the University of the Witwatersrand, the Johannesburg General Hospital and the Cardio-Pulmonary Research Unit of the Council for Scientific and Industrial Research—it will be read with more than usual interest and the conclusions arrived at by the authors are likely to be accepted by the average reader without query and question. While the authors state that the results of their series 'do not conflict with those of Malkiel-Shapiro and Bersohn, who used different criteria . . .' the impression is inescapable that the treatment in their view is of no great value. Thus the average practitioner after reading the paper (or the summary of the paper) is likely to be discouraged from trying this form of therapy.

Because we believe that parenteral magnesium sulphate is very often of the greatest benefit to sufferers from coronary heart disease both in its acute and chronic form we feel that the methods of investigation chosen and the conclusions arrived at by Drs. Sandler and McGregor merit close critical analysis.

Selection of cases. Symptoms resembling angina may result from conditions other than coronary heart disease (e.g. diaphrag-

matic hernia, peptic ulcer or gall-stones). These conditions, if present, would obscure and complicate the clinical picture and render the assessment of response to parenteral magnesium sulphate difficult, if not impossible. Three of their 16 cases had myxoedema (induced in 2 as therapeutic procedures). In our experience the presence of myxoedema constitutes a definite contra-indication to parenteral magnesium sulphate. In these patients symptoms get aggravated and lipograms do not improve on magnesium-sulphate therapy. We feel that these 3 cases should have never been included in the series.

Method. The effect of magnesium sulphate and a 'placebo' (saline) were compared by means of the 'double blind technique'.

With reference to the *placebo*, it is our considered opinion that this method, useful as it may be when a medication is given orally, is unreliable and misleading when used parenterally. No injection can be classed as a truly inert placebo, for the trauma alone inflicted by the needle may release a chain reaction in the body, the nature of which will be quite unpredictable and unknown to the investigator. Sodium chloride in this respect is a particularly bad choice. For many years past, hypertonic saline has been used with good results in cases of angina not improved by rest and conventional therapy.[9] The striking response obtained by the authors with injections of normal saline, far from disproving the value of parenteral magnesium sulphate, opens a new and interesting field of investigation.

The double blind technique. The essential prerequisite of this technique is that neither the patient who receives the injection nor the doctor who administers it should be in a position to ascertain whether the placebo or the active drug is being used. As a matter of fact, while ampoules of 50% magnesium sulphate and saline are apparently identical, they can be distinguished with the greatest of ease, because the former is conspicuously more oily and flows with greater difficulty into a syringe; also a drop of the solution spilt on the finger and put on the tongue would immediately reveal to the investigator the identity of the drug used.

As far as the patients were concerned we are told by the authors that 'the injections of (50%) magnesium sulphate were no more painful than the saline'. This is a truly startling assertion. We have given both injections to 6 individuals of average intelligence and in each case they found the discomfort from magnesium sulphate to be stronger and longer lasting than that from saline. To assume that a patient is incapable of distinguishing between the two casts a reflection on his intelligence and renders him an unreliable witness. We invite Drs. Sandler and McGregor to try both these injections on themselves.

Summary

We feel that, where a therapeutic trial on a newly described form of therapy is being conducted, at least the criteria for the selection of cases should in all respects be identical with those described by the original authors. In Dr. Sandler's trial series not only, on their own admission, were the criteria for the selection of cases different from ours, *but not a single patient* received more than 4 injections, where we recommend 12 injections. If, as stated by them, 75% of their cases greatly improved subjectively, even after the administration of only 4 injections, surely there was no reason to discontinue the treatment. When we analyse their lipid results from the control period to the end of the experiment and exclude only one patient who had an *induced myxoedema* which produced a rise of cholesterol from 190 mg.% to 369 mg.% (and surely magnesium sulphate cannot be blamed for this) we find, despite the inclusion of 2 other myxoedematous patients, that the lipograms of 8 out of 15 patients showed marked improvement and in 3 others partial improvement; i.e. 73% showed lipid improvement, which is even better than we originally claimed (14 out of 22 cases).

We fully agree (and have always advocated it) with Dr. B. G. Shapiro,[7] who makes a plea for a controlled investigation on a large scale in a teaching hospital. But, Sir, we respectfully submit that the manner in which the therapeutic trial was conducted by Drs. Sandler and McGregor cannot by any stretch of imagination be regarded as an adequate assessment of the use of magnesium sulphate in coronary artery disease, and their clinical experiment does not in fact, in any way disprove the efficacy of magnesium sulphate in coronary atherosclerosis.

We should like to quote from a recently published annotation by Dr. R. S. Parsons, Pathologist, Royal Hobart Hospital, Tasmania, in the *Medical Journal of Australia*, since this publication may not be readily available to the average medical practitioner. Dr. Parsons read a paper on 'The Biochemical Changes Associated with Coronary Artery disease treated with Magnesium Sulphate'. He said that as the result of the recent publication in South Africa of encouraging results in the treatment of coronary heart disease by parenteral magnesium-sulphate therapy (1 c.c. of 50% magnesium-sulphate solution given 3 times a week for 1 month), laboratory investigations had been undertaken on a group of patients exhibiting clinical and/or electrocardiographic signs of such disease. The investigations were carried out before and after magnesium therapy and while such patients were given a normal diet. To date, only 35 patients had completed the course of magnesium therapy; but the results so far showed, in the majority of cases, *a marked improvement in the biochemical pattern correlated with a similar improvement in the clinical picture.* The laboratory investigations consisted of the estimations of lecithin cholesterol and magnesium, fibrinolytic assays, and the demonstration of alpha and beta lipoproteins by electrophoresis. Dr. Parsons said that recent work by himself in England had demonstrated a lowered lecithin-cholesterol ratio (an excess of cholesterol over lecithin) in cases of coronary artery disease. Before therapy, all patients showed an abnormal biochemical pattern with lowered lecithin-cholesterol ratios, low magnesium level, high inhibition of plasmin (fibrinolysin), and usually a high beta-lipoid level with, frequently, a pre-beta band. After treatment, while the plasmin magnesium level was raised (although not to normal concentration), a normal biochemical pattern was otherwise found—normal lecithin-cholesterol ratio of 1·0 or higher, much reduced inhibition to plasmin, and normal beta lipoids with absence of the pre-beta band."[10]

In a personal communication to us Dr. Parsons[11] writes as follows: 'We have completed 50 cases of patients treated with magnesium sulphate and have reported our findings in a paper to the *British Medical Journal*. We feel that this form of treatment has surpassed other forms especially in cases suffering from angina. Medicine is a progressive science and in its multiple branches new forms of therapy are constantly appearing.'

To physicians who are students not alone of the manifestations of disease, but also of the working of human nature, there are few chapters in the field of therapeutics more interesting than those which record the response of medical men to the supposed advances in the treatment of disease. This can roughly be divided into 4 stages:

The first reaction is that of scepticism and outright rejection by the few whose verdict matters most. This is understandable in the light of past experience. Many medical men have announced their cure of disease, provided remedies to relieve symptoms, and invented methods of treatment that seemed to put off the inevitable tendency to dissolution. Yet few of these inventions and discoveries have maintained their early reputation. Another initial difficulty is that our views about a new and unorthodox method of treatment are already prejudiced by various influences, both emotional and intellectual, and particularly by theories which pervade our own thought, sometimes without our being aware of them. To be ruthlessly critical of another man's theories is one of the easiest tasks to accomplish. The 2nd stage in the 'life-history' of a new drug is one of unbridled enthusiasm and acceptance by the many. Wild and exaggerated claims are made in support of a new drug, impossible hopes are entertained or the drug may be used in the wrong dose and in the wrong way. This inevitably brings a useful remedy into disrepute (3rd stage) and it may take years before the 4th stage is reached and the drug makes its final reappearance in the field of therapeutics. The history of tuberculin is a glaring example of this.

B. Malkiel-Shapiro
I. Bersohn

South African Institute for Medical Research
P.O. Box 1038, Johannesburg
2 October 1958

1. Malkiel-Shapiro, B., Bersohn, I. and Terner, P. E. (1956): Med. Proc., 2, 455.
2. Papenfus, E. J. (1956): *Ibid.*, 2, 571.
3. Marais, A. F. (1958): *Ibid.*, 4, 66.
4. Agranat, A. L. (1958): *Ibid.*, 4, 67.
5. Teeger, A. (1958): *Ibid.*, 4, 77.
6. Feldman, H. (1958): S. Afr. Med. J., 32, 392.
7. Shapiro, B. G. (1958): *Ibid.*, 32, 715.
8. Sandler, A. and McGregor, M. (1958): *Ibid.*, 32, 697.
9. Feinberg, S. C. (1936): Amer. J. Med. Sci., 191, 210.
10. Parsons, R. S. (1958): Med. J. Austral., I, 883.
11. *Idem* (1958): Personal communication.